RAILROAD GAZETTE

FRIDAY, DECEMBER 7.

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Contributions.

Piston Rings of the Fall Brook Coal Co.

CORNING, Nov. 28, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the account of the piston rings designed and made by me for the locomotives of this company, published in the *Railroad Gazette*, Oct. 26, there are some errors and misunderstandings which should be corrected.

I do not claim that the way in which I make the rings is the very best way, and I do not consider the manner of making the rings as much as I do the ring itself. I used to make them in the way which you mention, and at first only made them $\frac{3}{32}$ of an inch larger than the cylinder, but there was not spring enough, and in order to get more I turned them from $\frac{1}{4}$ to $\frac{3}{4}$ in. larger, and cut enough to spring them on to a ring $\frac{1}{10}$ in. larger than the cylinder, and then have space enough for dowel pin. We take a casting that will make from 14 to 16 rings, fasten it to the face plate, bore to the proper size and turn to from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch larger than the cylinder. The casting is faced up true and the ring cut off $\frac{3}{64}$ in. thicker than the finishing size. After cutting off all the rings the casting will make, each one is taken, fastened to the face plate on the faced side and faced on the other side. I then take half-a-dozen rings, if I want as many of one size, and put them into a ring $\frac{1}{8}$ larger than the cylinder, fasten them to the face plate, slip the ring out and turn them to the size of the cylinder.

These rings cost 75 cents apiece, making the cost $3 for a set. I send you by express a packing ring that has run in a 50-ton mogul, 19 × 24 cylinder, hauling coal trains 113,000 miles. The cylinder head has been taken off once, but there was nothing done but to look at the cylinder. The engine then ran six months and broke the other ring, and of course I put in two new rings. The broken one is $\frac{1}{2}$ in. thick.

WILLIAM A. FOSTER,
Superintendent of Machinery.

Instruction of Trainmen.

SAVANNAH, Ga., Nov. 27, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Following up the article on "Examination of Trainmen" by "Langdon" in your issue of Nov. 23, a subject which is certainly worthy of serious consideration by all officials who are directly responsible for the efficiency of their train service, it has occurred to me that it might be of some interest to explain a system of examination and instruction of trainmen, which has been in effect for some time on the Savannah, Florida & Western. This system seems to me to not only embody all the good points set forth in "Langdon's" letter, but to go far beyond; it is a theory reduced to practice, and in a way that cannot help but produce good results wherever applied.

By way of explanation, it is proper to say that this road has attained in practice the best results that it would seem possible to be obtained from the "civil service" system of promotion. All engineers are promoted from firemen and all conductors from flagmen. These candidates are compelled to pass a rigid examination in each instance before they can secure promotion or assume any direct responsibility. For instance, a fireman, before he is given charge of an engine, is compelled to undergo an examination before an examining committee, consisting of two of the oldest and best engineers, and one of the most efficient conductors. The duty of this examining committee is to examine the candidate not only as to his knowledge of the rules and regulations of the company, but also all sorts of emergency questions are put to him, which have come up within the experience of the committee, and which are likely to come up at any time in every day work. The candidate is never asked any regular set of questions, as there is generally a different committee that examines each candidate. These examinations are each reduced to writing, and on this the committee report favorably or otherwise, as they may feel justified in doing from the evidence brought out in the examination. These reports are all placed on file and preserved as a certificate of each man's competency. Every man understands that time of service alone does not entitle him to promotion; he knows that he has got to pass this examination or he will never be promoted. Naturally, the ambitious ones strain a point to familiarize themselves with all the rules and be ready to pass the necessary examination when a vacancy is to be filled. So much for the system of examination.

Several months ago, for various reasons, it was deemed expedient by the management to appoint an "Inspector and Instructor of Train Service." The duties of this official, who is not clothed with any authority in matters of discipline, are to go over the line of road among the trainmen, and take them, crew by crew, questioning them as to how they understand the rules and learning how they carry them out. He is to answer knotty questions, teach the men how to become better and more efficient employés, and in short to keep a close watch over them in their every day work. To overcome all cause for looking upon this official with distrust, every man was made to understand in the beginning that, while the instructor was expected to report violations of the rules to the same extent that every employé is required to do, and no more, his chief duties were to *instruct them how to carry out the rules*. Instead of getting the men into trouble, he is to be of great assistance in keeping them out of it by inculcating greater familiarity with the rules.

The "Inspector and Instructor of Train Service" is appointed periodically, the appointment being made from among the oldest conductors. He receives his usual salary as a first-class conductor, and the previous incumbent falls back to his old position as first-class conductor.

Since this plan has been in effect better results have been noticeable, fewer accidents, less complaints of improper conduct, more efficient men, and in fact everything shows the value of such an official to us; and I believe one of this kind would be equally valuable to every road, except those which are so small that some higher official can follow out the same course of instruction to the men in his train service.

W. W. SYLVESTER.

Second Annual Report of the Inter-state Commerce Commission.

The following is a summary of the leading points of this report: Mileage, June 30, 1888, 152,781; constructed in 1886, 8,471; in 1887, 12,688; in first half of 1888, 2,312.

Carriers Subject to the Act.—It is doubtful whether, with the exception of municipal or mining railroads, there is any which does not, to some extent, engage in inter-state traffic. The officers of companies situated wholly within one state expressed surprise in many instances at the requirement of annual reports by the Commission; but there can be no question of the right of Congress to require such reports, while for statistical purposes it is necessary that these should be included in any exhibit of the railroad operations of the country.

A carrier operating a state line, but participating in inter-state traffic, cannot form traffic arrangements on some classes of business and not on others. If it were allowed to do so the law against discrimination might, in a great many instances, be rendered futile. Nor can a road lying wholly within one state, but operated by an inter-state company, be exempted from responsibility under the act.

Express Companies.—This subject was treated at some length in the first annual report, in which additional legislation was urged upon Congress. This recommendation has not been acted on. The express business is now something of enormous volume. Its subjects and methods have expanded far beyond the anticipation of its founders. The relations between railroads and express companies, under present circumstances, involve special difficulties, and the Commission obviously believes it desirable that the scope of the act should be extended to cover these cases.

Administrative Work.—This has presented few features calling for special remark. The great majority of complaints have been adjusted without formal action. The most frequent complaint is of excessive rates. This is often made on insufficient evidence; but it is of importance that rates shall appear to be fair, as well as be fair in fact, which is the only means of preventing such complaints. The principle has been laid down that carriers, in making rates, cannot arrange them from an exclusive regard to their own interest. They cannot make prohibitory rates on railroad ties to prevent their transportation to a distance. Nor can they exercise arbitrary discrimination in giving season or mileage tickets to some points and not to others. The Commission is confident that very considerable advance has been made during the year in putting rates upon a better proportionate basis.

Under-billing continues to make trouble. The frauds are believed to have become less common than formerly, but the Commission still thinks that the act ought to be amended so as to impose a penalty upon shippers who knowingly obtain transportation for their property at less than the regular rates by devices of this kind. Free transportation of persons not entitled to it under the exceptions taken in the act is now rare. But the Commission doubts whether the limited pass, good only within a single state, is legal, especially when used for part of an inter-state journey.

In only two instances have decisions against the carriers been delayed in effect, the one of these, that of the Kentucky & Indiana Bridge Co. against the Louisville & Nashville Railroad, is still partially undecided, which gives excuse for the delay.

Long and Short Haul.—Much has been done to bring railroad rates into conformity with the general rule of the 4th Section. The Chicago, St. Paul & Kansas City gave plausible reasons for an exception, where a competitor was making unreasonably low rates. But the question involved was a question of the construction of the act, its answer was to be arrived at on consideration of what was probably the legislative intent. The circumstances and conditions of railroad earnings, entitling the carrier to make the exceptional rates, did not grow out of natural causes. They were due to a state of things that, at the pleasure of single companies, might be made to exist at any point of railroad connection in the country. If the greater charge of the shorter haul was admissible in the case under investigation, the rule of the 4th Section would be of no practical value whatever if a railroad company might by its action absolve a competitor from its obligation and be itself absolved in return. The legislature never intended this consequence.

Transcontinental rates have been much readjusted, partly as a result of the action of the Commission in the case of Martin v. Southern Pacific, and partly through an agreement with the Canadian Pacific in January, 1888, by which that road became a member of the Transcontinental Association, and was allowed differentials of from 5 to 10 per cent. on various classes of traffic. The Canadian road was understood as retiring from competition in respect to Missouri River business. Sept. 1, 1888, an entirely new system of tariffs was put into operation upon nearly 40,000 miles of road, operated by 18 different companies. The changes made were very radical, and were in the direction of conformity to the 4th Section of the law. They resulted in many reductions at intermediate points, partly compensated by some increase of through business. Except for ocean competition, which controls through overland rates to some extent, the rule of the short haul provision has been quite generally put into force on transcontinental business. In the Southern and Southwestern states there are peculiar difficulties, and the movement is slower, owing to the more universal controlling force of water competition.

Filing and Publication of Tariffs.—This has been enforced from the outset, and is made the subject of a special department, employing 14 men. The receipt of about 500 tariffs a day, or 160,000 a year, is acknowledged. The total number received has been about 270,000. No uniformity in form has as yet been reached.

Operation of the Law.—The Commission is possessed of no evidence that the general result has been otherwise than beneficial to the railroads. It believes that it has made all traffic more generally and evenly remunerative. Unquestionably the railroad business has suffered many losses during the present year, but they have not been due to the act to regulate commerce. The Chicago, Burlington & Quincy strike was a serious disturbance. The construction and opening of new lines of road have impaired net revenue. More serious consequences have resulted from rate wars, especially in the Northwest, while there seems danger of a similar result to the trunk lines.

Complaint has been made of certain rates as unreasonably and destructively low, although the Commission had no occasion to decide definitely on these facts. When the rate sheets are such that reasonable returns are not probable, a public injury is threatened. The apparent benefit from the very low rates is usually of little moment, but the public mind does not readily understand such cases. The public thinks that if a railroad manager makes low rates, it proves that such rates are remunerative. Unfortunately, the managers often intend to make money by other sources than legitimate operation. The public is altogether astray as to some of the means whereby railroad speculators expect to profit. Sometimes roads are built which involve direct loss to the capital of the community. Others which have been built in good faith are operated for stock jobbing purposes, to the detriment of all parties concerned. The reports which inter-state carriers are required to make to the Commission may have a conservative influence in this respect, as far as they show the distinction between legitimate and illegitimate profits.

Every case of rate war may be regarded as one of illegitimate profits. In the majority of such cases the losses are found in the end to exceed the gains. The law, unfortunately, does not prevent operations of this kind. It was made to protect the shippers rather than the investors. It is true that steady rates are more important to the public than low ones. Unreasonably low rates are antagonistic to good service, and may involve danger of accidents. But the general subject of unreasonable rates is one that directs itself most forcibly to the stockholders of railroad corporations, and they must learn to regulate the action of their representatives. A rate war under the present law is a much more serious matter than formerly. Yet the reductions are often left in the hands of subordinates who have no broad notion of their duties, and who are ready to meet cut rates with the utmost recklessness. The Commission admits the difficulty of the whole subject, but unqualifiedly condemns the manner in which it is now treated.

Unity of Railroad Interests.—One of the chief perplexities encountered in dealing with complaints against the railroad companies arises from the fact that, to the public mind, the railroad interest of the country seems in some sense a unity. While the several carriers have been treated, and are still treated, under the act to regulate rates, as individual and independent entities, the necessity of joint and general arrangements is strongly felt by all parties. Such arrangements require a strong centralized power which is more difficult to obtain than before, because of the prohibition of pooling. The Commission urges the importance of better relations of the railroads to one another, and discusses the question at great length, but without suggesting anything very tangible that can be done. The hardships of the present situation are admitted, but Congress is not urged to repeal the pooling clause.

Effect upon Cities.—The effect of the short haul clause was to diminish the discrimination in favor of the cities and large towns, and against small towns or country places. The readjustments under the act of course hurt the business of the merchants at certain points. The Danville, the Omaha and the Detroit cases are alluded to at some length, but the Commission does not justify the complainants in these cases. Proof that a railroad company is now, on an average, when all its stations are considered, charging higher rates than formerly, may be taken as strong *prima facie* evidence that rates are excessive; but their being higher in a single locality may be simply the result of an equalization of rates, which necessarily advances those which were proportionately too low, as well as reduces those which were too high.

Uniform Classification.—There is constant pressure from sectional and local interests to have classification favorable to particular districts. This has resulted in a great number of classifications in different parts of the country, so many as to constitute a public evil, on account of the misunderstandings to which it gave rise. The first step in the direction of reform was in the official trunk line classification of April 1, 1887. Eighty-seven roads now use this exclusively, and 44 use it partially. The Western classification was used by 69 roads in June, 1888. Since that date the Texas Association and the Trans-Continental lines have applied it to their business. These two and the Southern classification now practically include the railroad business of the whole country. Serious efforts have been made to merge the trunk line and the Western classifications. Thus far these attempts have not been successful, but the end is constantly kept in view by managers. The Commission believes that it would be undesirable to force anything like uniform classification at once. It sums up its conclusions by saying that uniformity of classification is desirable, that gratifying progress has been made in this direction, that so long as the carriers are laboring toward this end with reasonable diligence it is better not to take the work out of their hands, and that ample time should be given them for the purpose.

Immigrant Transportation.—The number of arrivals at the four seaboard cities was 534,000—nearly four-fifths of that number at New York. This traffic is subject to special abuses, and the means of regulating it are quite insufficient. The charge of thirteen dollars from New York to Chicago, in view of the greatly inferior accommodations furnished, is too large in comparison with first-class rates. The Commission recommends that some place of greater capacity than Castle Garden be provided for the reception of New York immigrants; that all regular lines of interior transportation be allowed to have agents at the places so provided; that the payment of commissions be declared illegal and punishable,

and that the Commission be authorized to prescribe fares for the transportation of this class of passengers.

Payment of Commissions.—No established rate of commission has ever been fixed, but the drain from net earnings on this ground is very large. The arguments against the system are strong. As between the ticket agent and the public there should be no inducement tending to put the former in the position of a drummer for business in behalf of a particular road. As between the ticket agent and his employer there should be no temptation tending to induce the latter to favor one remote connection rather than its equally remote competitor. A violation of these principles tends to wrong discrimination. The Commission recommends a universal percentage arrangement to all agents of foreign rates on the value of the coupons sold.

Conclusive Bills of Lading.—Under present circumstances the con-ignor of a shipment, when he has no means of fixing the responsibility for loss upon any particular carrier over which freight has passed, often has to bear deficiency on goods forwarded in bulk. This matter is chiefly important in the case of grain. Legislation holding the original receiving road responsible would be a hardship to that road just as much as it now is to the consignor, while the extreme accuracy in weighing which such a system would involve would cause additional expense. There is also danger that conclusive bills of lading may form a premium for fraud. The Commission is not prepared to make any recommendation on this subject. Closely akin to this is the matter of protecting the bills given in respect to charges when the charges are specified therein. The Commission commends the practice of the traffic manager of the Louisville & Nashville Railroad in going beyond the absolute requirements of the law in this matter.

No complaints have been received under the supplementary legislation with regard to government aided railroad and telegraph lines.

Annual Reports from Carriers.—In October, 1887, a circular was issued to all carriers, as well as to various state commissions and other persons interested in the general questions, inviting them to furnish suggestions as to the form of returns to be required. Experimental blanks were distributed in January, 1888. A meeting of railway accounting officers, representing more than 70,000 miles of railroad, was held at the end of March. The blanks were distributed in the month of June, and it was hoped that the returns would be completed by Sept. 15. This time has, however, been found too short.

The form of report is discussed at some length. Of special interest are the questions arising with reference to the value of a carrier's property, franchises and equipments, which many roads are, naturally enough, unable to give. The amounts paid upon the capital stock and the matter of payment are almost equally difficult to ascertain. Methods of charging gross earnings are also found to have been more divergent than had been supposed. The work of compiling returns is now in the hands of a special department, organized in much the same manner as the department of rates and tariffs.

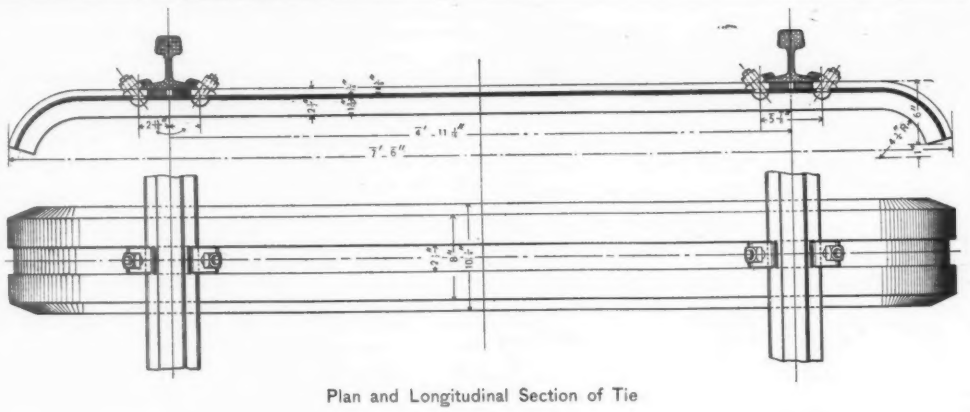
Amendments to the Act.—The Commission renews its recommendations of the last report. It also believes that notice of intention to reduce rates in not less than three days should be required, that false billing should be punishable against an owner, as already suggested, that the status of property carried in transit from a New York point through New Jersey back into New York should be more accurately settled, also the status of corporations operating existing roads through controlled stock. It is the opinion of the Commission that the interest of the public would be subserved by adding to the third section a provision that the facilities to be afforded shall include the due and reasonable receiving, forwarding and delivering by every such common carrier at the request of any other such common carrier, of through traffic at through rates, together with other additional language intended to give effect to this provision.

The Hartford Steel Tie.

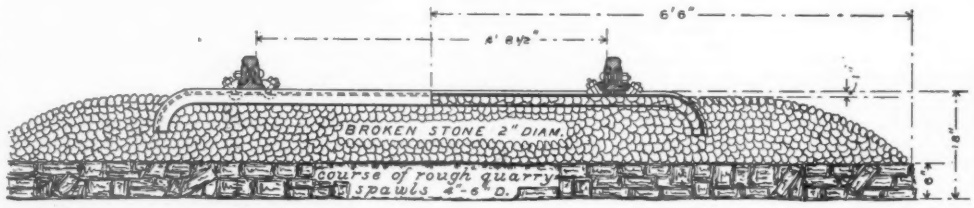
A valuable test of metal sleepers is about to be made by the New York Central & Hudson River, about a third of a mile of steel ties having been ordered for use on the Hudson River division. The tie which will be tried is made by the A. J. Hartford Steel Tie Co., of New York, and is very fully shown in the illustrations herewith. It is rolled from soft steel, $\frac{5}{16}$ in. thick in the body and $\frac{3}{8}$ in. thick in the flanges.

It will be seen from the cross section that the side flanges and the channel in the centre give stiffness and also by their hold in the ballast prevent shifting lengthwise of the track. The curve of the ends prevents shifting laterally. An inspection of the cross-section of track will make it at once apparent that this form of tie should have more lateral stability than the wooden tie, for in order to shift it, not only must the ballast at one end of the tie be moved, but also the whole prism of ballast in the hollow of the tie. In this particular the tie is as efficient as the Post tie, and in other respects it is simpler and possibly more efficient. The Post tie was shown in the *Railroad Gazette*, p. 585, 1887, and a year ago some 500,000 were in use in the various European countries and in Sumatra. That tie, it will be remembered, is thickened at the rail seat, and the rail seat is canted inwards, metal being flanged down more in the middle of the tie than at the ends. This gives a smaller bearing on the ballast, in the middle of the tie, and at the same time greater vertical strength, both of which features may be improvements on the form of the Hartford tie. Whatever the practical value of these features of the Post tie, up to October, 1887, notwithstanding its extensive use, not one had been found cracked in service. With the Post tie the rail is held in place by clips over the flange and bolts through the tie. These clips allow a slight lateral movement to adjust the gauge, something like a quarter of an inch, we believe.

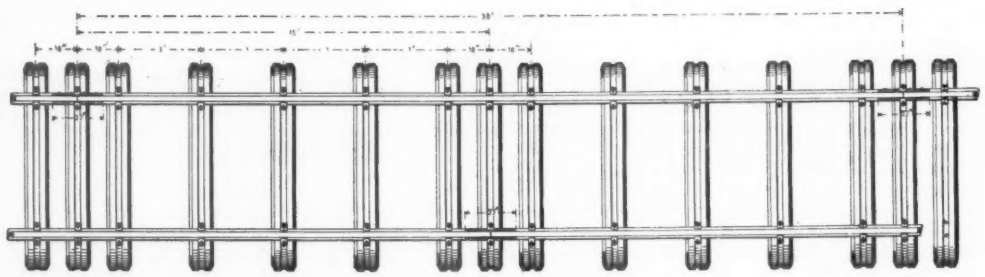
The London & Northwestern tie, which, after the Post, is probably the steel tie most used, is of uniform thickness throughout, but reinforced at the rail seat by a steel plate 15 in. long. With this tie the rail is held in a chair which is riveted to the tie, and is secured by a key of wood or steel. This device allows no shifting of the rail to adjust the gauge. Probably, however, this is not so important with the bull-headed rail, for which this latter tie is designed, as with the flange rail. With the former the position of the web of the rail against the chair determines the gauge, and there is not the same danger of variation in the



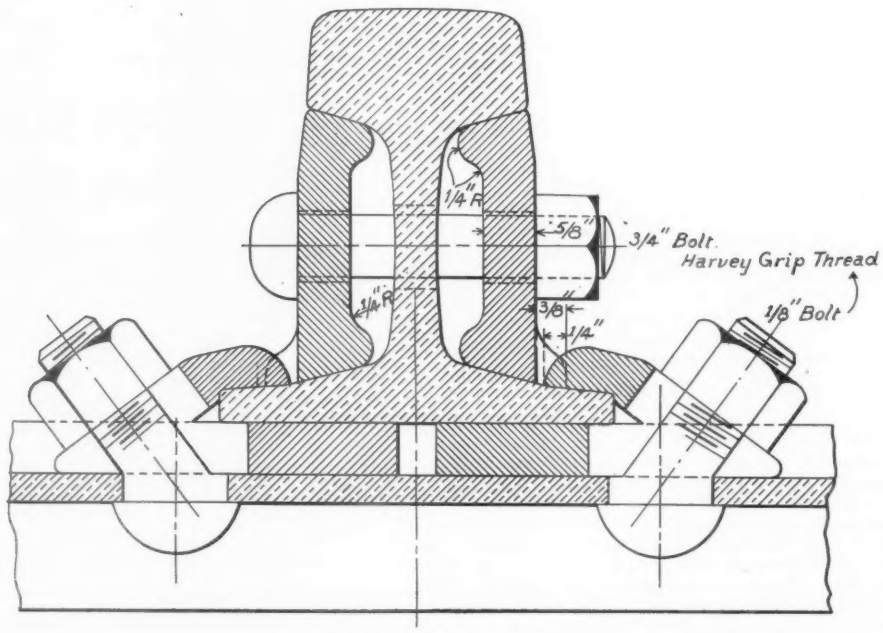
Plan and Longitudinal Section of Tie



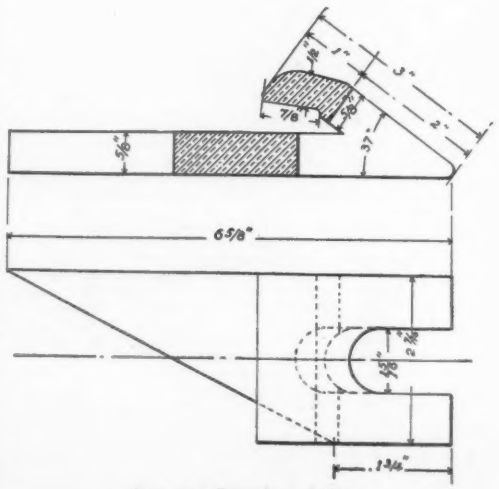
Transverse Section of Roadbed, Showing Tie in Place.



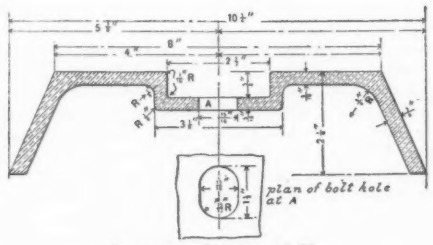
Plan of Track, Showing Spacing.



Section Through Joint.



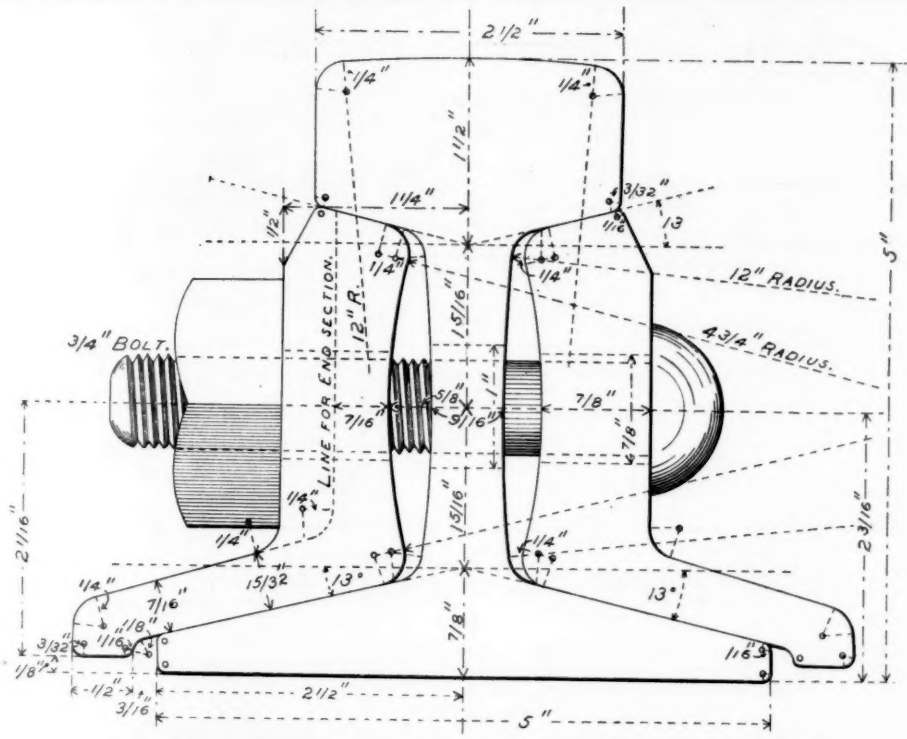
Plan and Elevation of Clip.



Transverse Section of Tie.

THE HARTFORD STEEL TIE,

As laid on the NEW YORK CENTRAL & HUDSON RIVER RAILROAD.



STANDARD 80-LB. RAIL AND 44-IN. ANGLE PLATE—MICHIGAN CENTRAL RAILROAD.

dimensions of the web and head of the rails that there is of irregularity in width of flange.

With the Hartford tie the rail is held in place by hooked clips which lie in the longitudinal channel. These are of such width that the rail has a bearing of the full width of the tie, eight inches. The bases of these clips are mitered, and it is designed to have enough play between them to allow for variation in the thickness or width of the rail flanges. They are held in place by bolts which are bent at an angle of 45 degrees with the vertical. These bolts are made with the Harvey grip thread, by means of which the nut, when turned home, automatically presses the threads into such shape that they constitute an effectual nut-lock. The clips receive these bolts in slots, which allow them to be shifted in or out some ¾ in. or more. By this contrivance there is ample provision for adjusting the rail accurately to gauge whatever may be the variation of the flange in width or thickness. This feature was suggested by Mr. Katté, Chief Engineer New York Central & Hudson River. In the earlier designs, the rail was gauged by the flange and not by the gauge line of the rail head, as is the case with nearly all other metallic ties. This Mr. Katté considered a fundamental error, and to get rid of it he suggested the neat device here shown. One incidental advantage of this form of fastening is that a rail can be taken out and another put in by slacking the nuts without removing the bolts; and the bolts can be put in place before the tie is laid.

On this tie the rails will be laid with a splice bar only 22 in. long, and supported joint. The splice will have but a small bottom flange. A slot in the flange receives the clip, to prevent creeping of the rail. The proposed spacing of the ties is shown in the engravings. They are laid 3 ft. between centres, and the joint ties 18 in. centre to centre. Each 30-ft. rail therefore takes 12 ties, but for the purpose of testing if a closer spacing is desirable Mr. Katté intends laying a portion of these ties with four ties between each group of 3-joint ties, making a spacing of 2.4 ft., centre to centre, instead of 3 ft. A portion of these test ties will also be made 8 ft. in length, instead of 7 ft. 6 in., to determine which length is practically the better.

Any further information concerning this tie can be had of the A. J. Hartford Steel Railway Tie Manufacturing Co., Temple Court, New York City.

Standard 80-lb. Rail—Michigan Central.

The 80-lb. rail which is shown in section in the illustration herewith has lately been adopted as standard for all the main lines of the Michigan Central. It is a pretty close approximation to the standard 80-lb. section of the New York Central, but with a shorter radius for the upper corner (¼ in. instead of $\frac{5}{16}$) and with the sides vertical. The base is also $\frac{3}{16}$ wider than in the New York Central rail. Altogether the section seems to be the best of the recent heavy sections that we have seen, and we should expect from it the best results.

The percentages of distribution of metal, as given by the chief engineer, are compared below with those in other modern heavy sections:

	Mich. Cent. 80 lbs.	N. Y. Cent. 80 lbs.	Penna. 85 lbs.	Reading. 90 lbs.
Head	42.36	44	47	49
Web	20.92	19	17	19
Flange	36.72	37	36	32

The heavy angle splice is also shown in section. This splice is 44 in. long. The Harvey grip-thread bolt will be used on all rail laid next year. The Michigan Central has used a 3-tie supported joint, 44 in. long, for some time, and although the section is lighter than that shown here, it has given excellent satisfaction. The same section used with the 24-in. splice was retained for the 44-in., largely to get an idea of the comparative value of the different lengths of splice. The three bolt-holes in each plate are, respectively, $2\frac{15}{16}$, $8\frac{15}{16}$ and $17\frac{13}{16}$ from the joint end.

The Buffalo Stationary Blast Forge.

The stationary blast forge, which is shown in the illustration herewith, was designed for the new works of the Burton Stock Car Co., at Wichita, for heavy smith's work.

The fire pan is 62 by 48 in. by 10 in. deep, with fire pit 4 in. lower still, giving a depth of 14 in. from top of tuyere plate to bottom of fire pit. The forgeis thus particularly adapted to large and heavy work. For light work the gates on the side can be opened and the fire lowered 4 in. The tuyere iron is extra heavy, with 3½ in. blast gate, fitted with an improved, anti-clinker, triangular ball for regulating the blast, and is designed especially to withstand heavy service without burning out. The water and coal boxes are cast in one piece with the fire pan, with a sloping partition dividing the two for easy removal of coal.

Although the patterns for these forges have but recently been completed and they have never been advertised, the makers state that they have already supplied them to the American Brake Co., the Binghamton Wagon Co., the Mexican National Railroad and others. Further information may be had from the Buffalo Forge Co., of Buffalo, N. Y.

Association of American Railway Accounting Officers.

At a meeting of the Executive Committee of the above association at Chicago, last week, a number of communications were received and referred to sub-committees, to be formulated for presentation to a general meeting of the association to be held at the Southern Hotel, St. Louis, on Jan. 24, next. These communications embody a variety of important suggestions, some of which we condense below, having insufficient space for their full presentation. As will be understood by those conversant with the previous transactions of this association, the chief aim in all propositions offered is the securing of uniformity in the work of the accounting office.

President M. M. Kirkman presented the suggestions of G. L. Lansing, Comptroller of the Southern Pacific; C. W. Gardner, Auditor Minneapolis, St. Paul & Sault Ste. Marie, and T. J. Hyman, Auditor Wisconsin Central. Mr. Lansing refers to the difficulty of dividing operating expenses between passenger and freight departments, as required by the Inter-state Commerce Commission, and thinks these requirements likely to prove of detriment to the railroads. Mr. Hyman, who has taken a prominent part in the work of the association heretofore, making valuable suggestions, refers to the necessity of holding a meeting of the association at an early date, in order that further agreement may be arrived at before the beginning of a new year's accounts. He believes that a majority of those who are working under the agreement made in Chicago about a year ago agree with him in this desire. Mr. Kirkman brings up the resolutions of the National Association of General Passenger and Ticket Agents, which association, it will be remembered, referred to the Accountants' Association the question of placing a limit on the time in which claims against foreign line on account of erroneous proportions may be made. This matter will now come before the Accountants' Association. Mr. Kirkman also suggests the advisability of having the Accountants' Association incorporated under the laws of Illinois, or of some other state.

W. F. Van Bergen, Ticket Auditor of the Chicago & Northwestern, offers the following propositions:

"First—That reports to foreign lines of coupon ticket sales and excess baggage collections shall be rendered within thirty days from the close of the month for which report is to be made.

"Second—That separate reports shall be made for coupon ticket sales and for excess baggage collections.

"Third—That coupon ticket reports shall exhibit the gross amount of revenue due to foreign lines on account of coupon ticket sales; that the through rate at which the tickets were sold shall be invariably stated, and that commissions paid for obtaining the business, or other similar charges or expenses, shall not affect the division of the earnings, nor lessen the amount of revenue to be reported to foreign lines.

"Fourth—That reports shall be accepted as rendered; and all clerical errors discovered in the checking of coupon ticket and excess baggage reports shall be duly stated upon a uniform style of correction sheet, and forwarded to the company at fault for adjustment in the next succeeding report, if found correct.

"Fifth—That all claims against foreign lines on account of erroneous proportions or other clerical errors shall be made within twelve months from the close of the month for which the report containing the error was rendered; and that no claim shall be made against any company for correction of errors, the total amount of which is less than 10 cents.

"Sixth—That when claim is made for proportion on a ticket that has not been reported, the ticket or coupon on which the claim is based shall invariably accompany it as voucher therefor.

"Seventh—That when deductions are made upon coupon ticket reports 'account of tickets redeemed,' the ticket claimed to have been redeemed shall invariably accompany the report.

"Eighth—That in the settlement of exchange passenger traffic between any two companies the difference between the totals of reports rendered and reports received on account of coupon ticket sales and excess baggage collections, shall constitute the balance, which shall be subject to draft by the creditor company as soon as ascertained."

J. O. Clifford, Freight Auditor of the Chicago & Northwestern, proposes:

"First—That a uniform receipt for freight received for shipment shall be adopted.

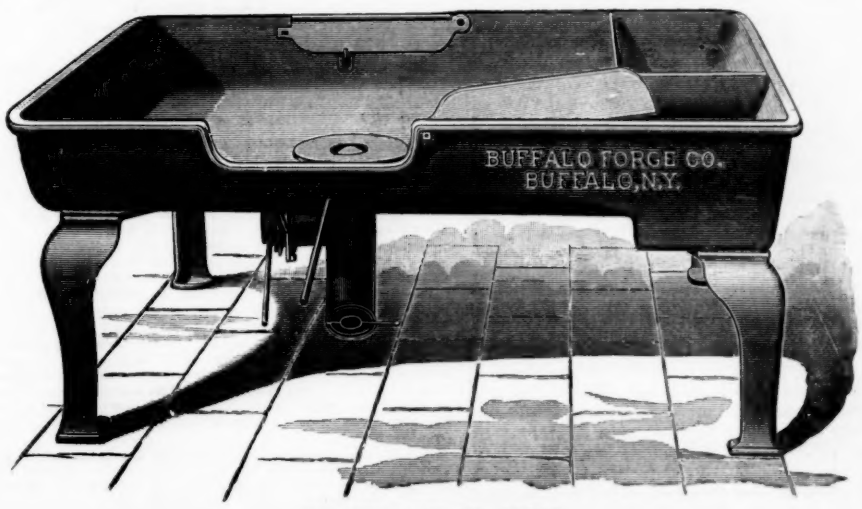
"Second—That the minimum amount for which correction may be made on through way bills passing over the lines of more than one road shall be fixed.

"Third—That the minimum amount for which correction may be made in statements of division of joint freight accounts shall be fixed.

"Fourth—That the manner in which statements of differences, rendered by the company receiving the statement of through billing for joint freight accounts, are to be taken up and adjusted in subsequent months' settlements, shall be fixed.

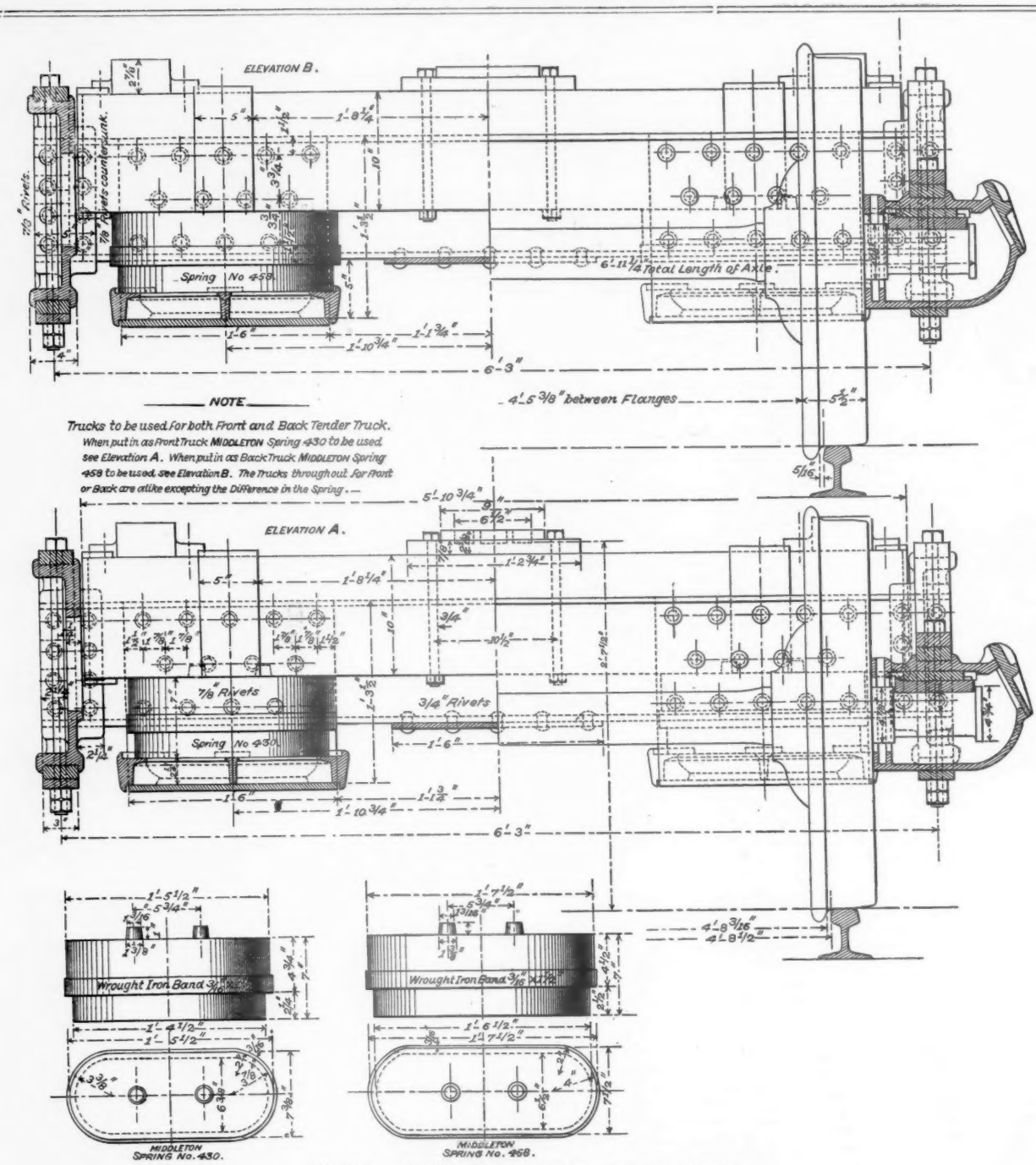
"Fifth—That an understanding shall be had in regard to the settlement of freight way-billed through over two or more lines for which the weight is not known, such weight being ascertained en route or at destination."

Two committees were appointed, one on passenger matters, consisting of Messrs. Williams, Whitehead, Riebenack and Waterman; and one on freight matters, consisting of Messrs. Kelsey, Warner, Quarrier and Little. These committees are



STATIONARY BLAST FORGE.

Made by the BUFFALO FORGE CO., *Buffalo, N. Y.*


ELEVATION B.
2½" Rivets.
⅞" Rivets countersunk.
Spring No 459.
6'-11¼" Total Length of Axle.
4'-5 3/8" between Flanges
5½"
5/16"
NOTE
Trucks to be used for both Front and Back Tender Truck. When put in as Front Truck MIDDLETON Spring 430 to be used see Elevation A. When put in as Back Truck MIDDLETON Spring 459 to be used. see Elevation B. The Trucks throughout for Front or Back are alike excepting the Difference in the Spring.
ELEVATION A.
⅞" Rivets
¾" Rivets
Spring No 430.
6'-3"
Wrought Iron Band ⅜ x 2½"
MIDDLETON SPRING No. 430.
MIDDLETON SPRING No. 459.

STANDARD TENDER TRUCK—UNION PACIFIC RAILWAY.

to make such inquiries as they are able in regard to joint accounts for passengers and freight, and report to the meeting of the association to be held at St. Louis in January. Thus the matters likely to come up at that meeting will refer almost wholly, if not entirely, to joint freight and ticket accounts. It is desired that every railroad interested in such matters—and that means all roads—should be represented at the meeting.

Air-Brake Rules on the Chicago, Burlington & Northern.

The Master Mechanic of this road has formulated a code of rules for the instruction of engineers, trainmen and inspectors in the use of air-brakes, and has added to it a quite extensive series of questions for use by the examiners in testing the men as to their knowledge of the brake apparatus and its use. The general rules are quite similar to those in use on many other roads and with which our readers are familiar. A noticeable feature, however, and one which illustrates the care that has been taken to make the rules simple, is Rule 7, giving directions how to apply the brakes from the inside of a car. It reads:

To apply the brakes from the car.—This can be done in three ways: First, by pulling on the conductor's valve cord and *holding it down* until the train is stopped; second, by disconnecting the couplings; third, by turning down the handles *A* on the rear end of train. These methods should be used only in cases of emergency.

This, of course, is very simple and to the majority of readers would, perhaps, appear of questionable utility; but, as has been before observed in this connection, as regards all sorts of rules, simplicity is the chief desideratum and in case of doubt should always have the preference. If only the language be perfectly clear, so that no possible misconstruction can arise by the presence of the rule, it can do no harm to those who do not need it, and is of real benefit to others; and not merely to those who may be wholly ignorant on the point treated, for it serves to give definiteness to the thoughts in the minds of many others, who perhaps have the knowledge in their heads but have it in a shape which is unavailable in emergencies.

Of the questions for examination there are about 50, and most of them are very well put and plainly indicate that their compiler intends to get some real information as to the knowledge of the men whom he questions. For samples we give: Question 4: Why is automatic air used in preference to straight air? Question 21: What is the cause of premature release of brakes? Question 31: Why is 20 lbs. reduction of pressure enough to make a full application of the brakes? * *

The answers to the questions, as printed, are not so well constructed, and a perusal of them indicates that they are, in many cases, not much more than a basis for an answer. Considerable additional questioning must, we think, be employed to get the positive assurance that the candidate is actually giving an intelligent answer to the whole question.

The men are required to rehearse the code of bell-cord signals with fluency.

The rules for the government of engineers when two or more are pulling the same train are of especial interest, and we give them in full:

RULES FOR HANDLING AIR WITH DOUBLE HEADERS.

1. In running double headers, the train is to be practically under the control of but one engine and engineer, which WILL INVARIABLY BE THE ONE IN ADVANCE. This engine will start the train (when it can be done) without any assistance whatever from the second one; will set the rate of speed to be run, which must be closely observed by the second one at all times, and is to have the exclusive use of the brakes, with the exception provided for in Rule 4.

2. The second engine will bear the same relation to the train, as far as starting and stops are concerned, as one of the coaches, with the exception provided for in Rule 4.

3. *After the engine in advance has started the train, the engineer of the second engine may begin to work steam, and not before*, as his engine is simply to furnish additional power after the train is in motion, and the engineer in charge of this engine must watch closely, and obey promptly, without any hesitation, all signals which the advance engineer may gave.

4. The second engine will carry in her main reservoir by keeping the handle of the engineer's valve always on its centre from 80 to 90 lbs. of air, which is to be used only for releasing the brakes, where the engine in advance is unable to do so, whether from improper handling of the brakes in making the stops or from any other cause. However, this is only to be done on a signal from the advance engine, which will be two light blasts of the whistle.

5. Signals to be used while running are as follows: A light single blast of the whistle, given by the first engineer, to be understood by the second engineer as ease off a little. A pronounced single blast, to shut off entirely. Two light blasts to work his engine a little harder, and two heavy blasts to come ahead as hard as he can.

6. In running double headers on freight trains, partially equipped with automatic brakes, unless there are more than 10 air-brake cars in the train, the driver and tender brakes on the head engine are to be cut out by the triple valve. The air hose between the engines, however, will be connected so that the brake can be applied on the second engine and cars by the engineer of the head engine, as per rule 1.

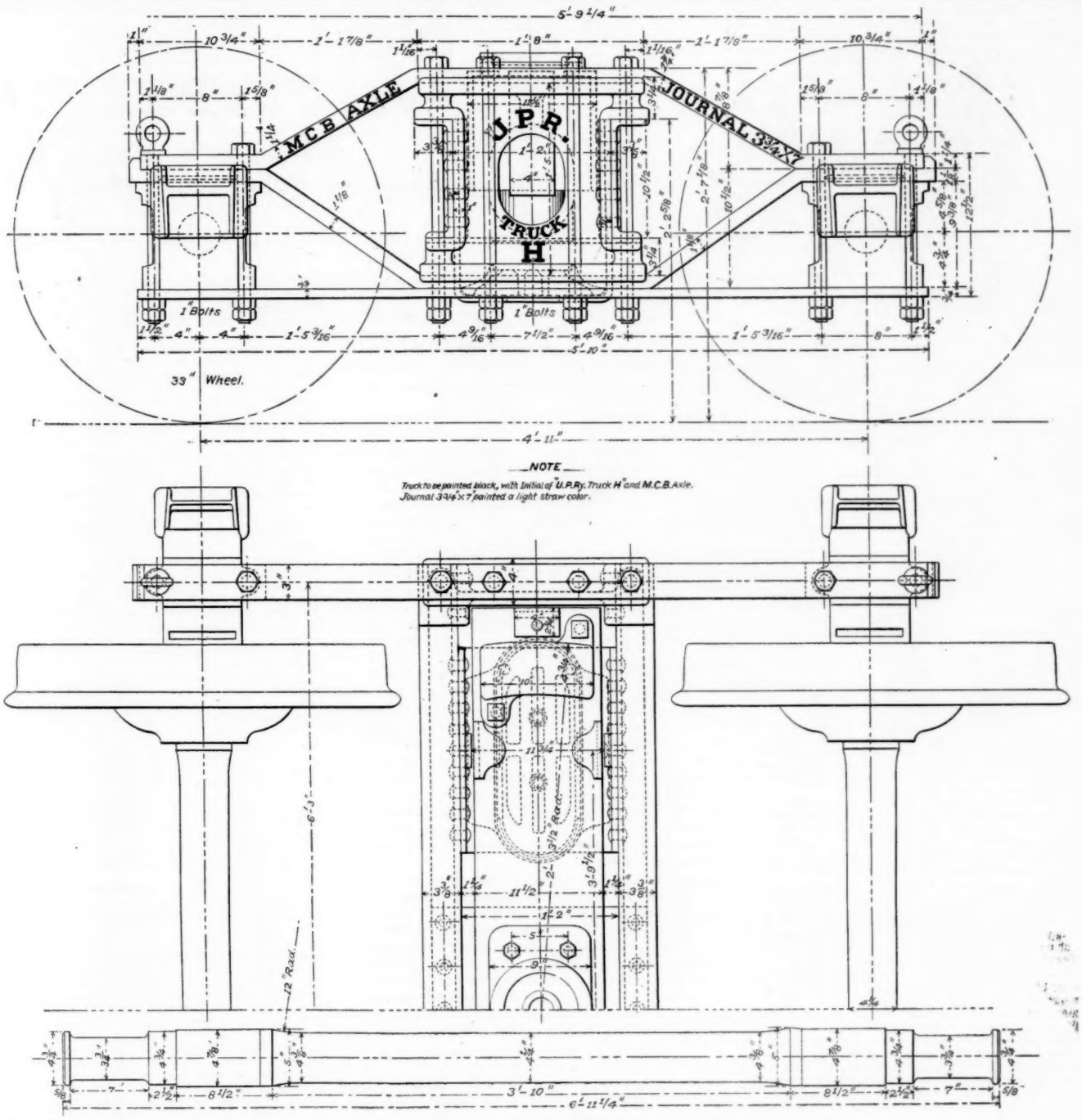
Standard Tender Truck, Union Pacific Railway.

The accompanying engraving represents the standard tender truck used under the Wootten express engine for the Union Pacific, illustrated in preceding issues. A perspective view of the engine was given in the issue of June 15, 1888. Detail drawings of the boiler, fire-box and smoke-box appeared in the same issue, and the driving wheels and axle were shown in the issue for July 6, 1888. The frame was illustrated Aug. 17, 1888.

It will be seen that the diamond truck is used, and that the front and back trucks are alike, except as regards the bolster springs, which differ slightly, as shown below:

	Front spring.	Back spring.
No.	430	458
Height, free	7 in.	7 in.
" with 18,000 lbs. load	6¼ in.	....
" " 20,000 lbs. load	.....	6⅝ in.
" " 26,000 lbs. load	6⅜ in.	6¼ in.

The M. C. B. axle is used, and it is made to the following specification: Axles of iron or steel. If of iron, to be hammered from iron re-rolled from muck-bar not exceeding ¾ in. in thickness; it must be tough and fibrous, uniform and free from scrap. Iron axle must stand without fracture three blows at a 10-ft. drop and two blows at 15 ft. of a 1,640-pound hammer, striking midway between supports 3 ft. apart, axle to be turned over after each blow. If of steel,



STANDARD TENDER TRUCK—UNION PACIFIC RAILWAY.

to stand without fracture five blows from a 1,640-lb. hammer, at a 20-ft. drop, striking midway between supports 3 ft. apart, axle to be turned over after each blow. All axles must be stamped midway between ends with maker's name and place of manufacture.

Some of the Effects of Silica and of Aluminum in Working Iron.

The silica process in the manufacture of iron and steel seems to be approaching the stage of actual trial on a commercial scale. In a pamphlet recently issued by the company which controls the process we find the statement made that 11 of the largest manufacturing establishments in the United States have taken license to use the process and are "preparing to go regularly to running on it at an early day." It is further said that the silica process is a simple and novel use of comparatively pure silica (SiO_2) as a helper in the manufacture of superior iron and steel. It needs no special plant nor any additional machinery, and is not confined to any particular department of the iron industries, but it is applicable to all other processes for the production of cast iron, wrought iron, steel and cast steel.

It is claimed for this process that it makes an acid slag, and removes the oxide of iron; it lessens the amount of carbon in the iron; promotes the formation of graphitic carbon, and antagonizes the formation of combined carbon; changes the hard, white irons into soft, tough gray irons; liberates the occluded gases, leaves the molten metal quiet in bath, ladle or mold, and renders the product comparatively free from porosity; helps the elimination of sulphur and phosphorus; it diminishes the tendency to shrinkage and cracking in castings; leaves the castings cleaner when they come from the molds; diminishes full one-third the quantity of ferro-manganese used in steel making; augments the electrical conductivity of steel wire, and it increases the tensile and resilient strength of iron and steel.

Under the date of Sept. 26, 1888, Mr. J. B. Johnson, Professor of Civil Engineering of Washington University, reports to the President of the Mullins Silicated Iron & Steel Co., the results of tests on cast-iron made by him for that company. He says: The specimens were brought to me in the rough, being 1¼ in. in diameter and some 14 in. long. They were turned down at the laboratory under my direction, and tested on a Riehlé 100,000-lb. testing machine of the latest improved pattern. The working qualities of the metal were observed and its appearance on the fractured surface noted. All tests and computations were made by me personally. With a very few exceptions, I was ignorant of the source and composition of the specimens, neither did I know which were silicated and which not, until after the tests were completed. No record of this information was kept by me, however, and you have to-day sent me the information which alone enables me to classify the results into "silicated" and "*non*-silicated," and also to determine which tests were on identical mixtures.

My tests and examinations have been directed to the following properties of the iron: Internal structure, working qualities, tensile strength and resilience.

The silicated iron shows a remarkable uniformity of structure across the section, being close and fine-grained throughout. It appears more dense and more free from blowholes and from the spongy structure generally found at the centre of thick castings. If tested for specific gravity, or density, I believe it would show greater weight per cubic foot than ordinary cast iron. Its structure would also lead one to predict a less shrinkage in cooling than ordinary iron, and if this is the case, then the internal strains which are caused by this excessive shrinkage, would be proportionately reduced. If it should prove to be true that the shrinkage is very much less than it is in other irons, as I am inclined to think is the case, then one very serious objection to the use of cast iron in heavy masses, and in complicated forms, is removed.

Almost without exception, the silicated specimens have worked well in the lathe. They have been soft and tough, many of them remarkably so. With the exception of a few mixtures of car wheel iron, which would be classed as "hard," all the silicated specimens submitted to me have possessed practically perfect working qualities.

Tensile Strength.—He made in all 74 tests of tensile strength, 43 of which were on silicated cast iron and 31 on non-silicated iron. In only 14 cases were the mixtures identical, except for the silicated treatment. In the other instances the silicated process was applied to cheaper mixtures, and the products compared with the standard output of the foundry. These test specimens are said to have come from 13 different foundries.

A fair comparison of results, to show the effect of the process, can only be made, therefore, between the silicated and non-silicated mixtures, which were otherwise identical. Comparing the results of these, we obtain the following averages, the tensile strength being given in pounds per square inch:

	Silicated.	Non-silicated.
No. of tests	14	14
Average tensile strength	25,400	20,730
Maximum strength	31,570	24,530
Minimum "	19,760	16,550

The greatest increase of strength was from 19,410 to 28,800, or an increase of forty-eight per cent. The least increase of strength was from 23,500 to 24,500, or an increase of five per cent., as a result of the silicated treatment, the mixtures otherwise remaining the same.

Resilience.—The resilience, or spring of a metal, is its ability to resist a shock or blow. It is not simply its strength, but its ability to distort under a blow without breaking. Since cast iron breaks usually from shock, its resilience, or ability to resist shock, is of much more importance than its strength. I have computed the total resilience in inch-pounds per cubic inch of the metal. The resilience of cast iron varies from 20 to 140 inch-pounds per cubic inch, the average grades of good cast iron having a resilience of about 50 inch-pounds per cubic inch. The resilience is found by c refully measuring the extension of the specimen for each additional 1,000 lbs. stress, and from this data computing the number of inch-pounds per cubic inch of work, or energy, required to break the material. The apparatus used at Washington University is from my own design, and will measure the extension of the specimen to the nearest one ten-thousanth of an inch. It has not been customary to make these tests on cast iron. Indeed, very few such tests have ever been made, but I regard them as many times as important as the tests for tensile strength. It is, in fact, the *only* real test of the ability of the iron to withstand repeated shocks of all kinds. Even the drop test is worthless for this purpose, since each blow weakens the piece an unknown amount, and the final blow therefore proves nothing.

Resilience Tests on Identical Mixtures.

	Silicated.	Non-silicated.
No. of tests	8	8
Average resilience	107.5	56.6
Greatest "	140.0	111.0
Least "	48.0	23.0

We may say, therefore, that the silicated process increased the ability of these eight mixtures of cast iron to withstand shock by an average of 90 per cent., or it nearly doubled the strength of the iron, if it were to be broken by shocks or blows of any kind. Or, in common language, we might say, it makes the iron more malleable.

The similarity in certain effects of aluminum upon cast iron to those which, it is claimed, result from an admixture of silica is shown by the following extracts from the paper by Mr. W. J. Keep, presented at the August meeting of the Association for the Advancement of Science, on the "Influence of Aluminum on Cast Iron." This elaborate paper was widely reprinted at the time, and we will make but few

extracts. Concerning the solidity of the castings, Mr. Keep says:

These sound castings of the white base alone resisted a weight of 379 lbs. With one-tenth of one per cent. of aluminum added, it resisted 545 lbs., a gain of 166 lbs., or about forty-four per cent., from this small addition. The castings appear of slightly finer grain, and the character of the crystallization is somewhat different, but the secret of the strength lies in the closing of space between the grains, or, in other words, in the increased solidity of the casting. No other change is noticeable in the metal.

On the effect of the aluminum upon the grain, or the changing of carbon from the combined to the graphite state, he says:

Aluminum allows most of the carbon to retain its natural combined form until the metal is too thick for the separated carbon to escape, but at the instant of solidifying aluminum causes the iron to drop a portion of its carbon from the combined state. This liberated carbon takes the graphitic form, and is imprisoned in the otherwise solid iron. The advantage arising from a change of carbon from the combined to the graphitic state at the instant of crystallization is that all the carbon thus liberated is imprisoned uniformly throughout the casting, and is not accumulated in pockets forming soft and hollow spots, as would be the case if liberated while the casting was yet fluid. Aluminum, more than any other known element, accomplished this. It not only changed white iron to gray, but seemed at once to change the whole character of the metal. The drop of carbon seems to be instantaneous, at the instant of crystallization, and for this reason the time taken in cooling has little effect. In fact, when the aluminum obtains full control of the carbon it would seem that the more sudden the cooling the more the formation of the graphite, and the thin portions of the casting are therefore as gray as the thicker portions. Take the samples made from the white iron base, with almost no silicon present. The base alone gives a white bar full of blow-holes. An addition of one-quarter of one per cent. aluminum gives us not only a perfectly homogeneous and solid casting, but the color is darker and the grain shows that some of the carbon has taken the graphitic form. The thin casting shows this even more than the heavier bar, showing that the change occurred suddenly and that time had but little effect. Examining such bar in turn, we see that each similar addition of aluminum produces a corresponding effect, until at the third addition, or three-fourths of one per cent., the casting is gray with no sign of white, either in the square or in the thin bar. The set of tests with the gray iron base, containing one and one-quarter per cent. of silicon, shows that silicon and aluminum work together in the same direction, and that a slight audition of aluminum takes the white out of the casting at once, giving the same grain in a thin as in a thick casting. This effect increases as the aluminum increases, and the indications are that at least up to four per cent., the limit of our experiments, the more aluminum, the softer and grayer the castings.

Further, aluminum causes the carbon to assume the graphitic form on the instant of solidifying, and therefore the sudden abstraction of heat does not imprison the combined carbon and cause chill. This effect of aluminum is to give a uniform grain for thick and thin castings, and not allow the coldness of the mold to affect the grain.

It was found that the addition of aluminum increased the transverse strength of the iron both under dead weights and under blows. We see that the capacity to resist impact is increased by the addition of aluminum much more than the capacity to resist a dead weight, and the test bars made with the white base are benefited far more than those made with the gray base.

Our tests of fluidity are correct as far as each individual heat is concerned, but variation may be due to the heat of the metal of that particular cast when poured. Viewed in a general way, the indications are that with the white base, with almost no silicon, the aluminum has increased the fluidity; judging from the series with the gray base, we would say that, combined with silicon, aluminum reduced the fluidity, but later tests show that the aluminum, to a very marked degree, increases the fluidity.

Our remarks in connection with shrinkage show that a sharp casting is produced by the instantaneous dropping of graphite when crystallization takes place, and that if the iron is fluid enough to fill the mold any extra fluidity causes the iron in shrinking to draw away from the mold. Again, the percentage of aluminum necessary to bring about these desirable results will be too small to have much effect upon the fluidity of the metal. The fact of the iron giving sharper and more perfect castings, caused by the deposition of graphite at the instant of solidification, might cause the iron to be pronounced more fluid, if judged by the appearance of the castings.

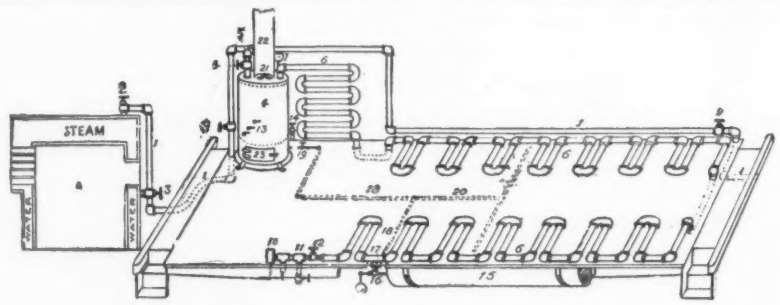
The Timlin-Heidinger Car Heating and Lighting System.

Concerning this system we have received the following letter from Mr. C. H. Sharman, Vice-President and General Manager Illinois & St. Louis Railroad, under date of Nov. 30, 1888:

"In compliance with your request, I submit for publication in your paper, a statement concerning my experience with steam heat, on the cars of our road.

"We have our cars equipped with the Timlin-Heidinger system, which we operated all last winter, having fitted a number of our cars with it in October, 1887. This system involves heat by steam, direct from the locomotive, when the cars are *en train*; also, an independent heater with compressed city gas for fuel, when cars in use are detached from the engine, the gas, in the meantime, supplying our needs for illumination. The gas is carried at a high pressure in tanks beneath the cars. The system embodies the steam generator, or locomotive, in combination with a car boiler, or storage chamber in each car, the generator and storage chamber being connected with the train pipe, 1 in. in diameter, tapping the engine at the steam and water spaces and running the entire length of the train, the couplings between platforms being the Westinghouse hose and coupler. The heat is distributed through the cars from the storage chamber in U bend pipes under the seat.

"Except the couplings, the entire device is within the cars. As a result the condensations are purely nominal, and as they are automatically trapped off our system is substantially one of dry steam heat. On the make up of our trains they are quickly warmed, while the heat is easily regulated and maintained at any given temperature. After first charging our trains with steam on its make up, the pressure on the gauge of our storage chamber will register less than one-half pound, when we have a temperature of 70 degrees in the cars—dry steam heat, at a low pressure. As an evidence of the ability of the system to retain heat, last winter, when the thermometer stood at ten degrees below zero, our cars, at the expiration of two hours and forty-five minutes absence from the engine, retained the heat of 65 degrees. Both as to heat and light, in the matter of economy, simplicity and safety, the system has given entire satisfaction, and we now have all our cars equipped with the device."



The Timlin-Heidinger Heating and Lighting System.

The cut herewith is thus described by the makers of the apparatus:

1 is the 1-in. train pipe running through the train, tapping the locomotive boiler at valves 2 and 3, feeding steam or water, as occasion demands, into the tubular car boiler or storage chamber 4, through the supply pipe 5. The steam circulates through the radiating pipe 6. The pressure in storage chamber 4 is regulated by valve 8; 9 indicates the train pipe always open, except at the rear of the last car in the train, where it is closed· 10 is an automatic drip valve which keeps the radiating pipes constantly drained, and 11 is a blow-off cock for instantaneous draining of the pipes when cars are to to be set in the yards; 12 is a valve remaining open except when a car in use is side tracked, then opened and closed as occasion may require; 14 is a blow-off cock to the storage chamber; 15 is the gas tank, 8 ft. long by 16 in. in diameter, holding 500 ft. city gas, under pressure, and used for illuminating the car through pipe 20, as also for fuel, through pipes 18, into the furnace, which is used as an independent heater, when cars in service are detached from the engine. The flow of the gas from the tanks to the furnace, as also to the illuminating jets, is regulated to any desired pressure by an automatic valve 17. The storage chamber is a boiler 44 in. high by 16 in. in diameter, 21 indicating the flues through which the heat, generated by the gas, is transmitted when the storage chamber is used as an independent heater.

In fifteen minutes, with the thermometer at 10 deg. below zero, the cars can be heated to a temperature of 70 deg. The cars once thoroughly warmed, the flow of steam is almost wholly cut off, as the least possible flow maintains the temperature, the pressure on the gauge not registering over one-half pound. By closing valve 8 in any one or more of the cars, the circulation of heat may be cut off from such car or cars. In heating cars by this system, there is no perceptible increase of fuel consumption by the locomotive, nor does it bleed the engine as to its motive power.

When a car is to be cut out for service, the independent heater is prepared for use by the engineer, who closes the steam valve and opens the water valve, charging the car boiler with hot water to the second gauge. The water valve is then closed, the steam valve reopened and the water superheated with dry steam charged into the water through the supply pipe, extending down into the water, being perforated. A car thus charged will remain comfortable for several hours without further applied heat. When the temperature begins to decline the gas under the storage chamber is lighted, and the heat kept up until the car is again attached to the engine.

In applying this device the cars are not defaced, as a half dozen inch holes in the floor of the car for the train and gas npppripes and valves are the only openings made.

The Uses of Theory in Bridge-Building.

In some remarks on the use of theory in engineering, by Professor Unwin, printed in a late issue of *The Engineer*, occurs the following, concerning a recent paper which attracted considerable attention in England—Mr. Thomson's paper on "Mechanical Pathology."

Professor Unwin says:

One would on this side of the Atlantic have been a little disposed to say that if in any part of the work of the engineer theory had proved a useful guide, it was in the building of iron girder bridges. Almost every improvement of design had been an attempt to conform more closely to conditions imposed by scientific reasoning, and it would be strange if it were not so, for an iron railway bridge is, among all structures, that in which the conditions of loading are best known, and the quality of the material used most carefully ascertained. No builder of a bridge of large span would have found his task a possible one without the help theory afforded him. Mr. Thompson's paper is based on a fact, however, so remarkable that it almost justifies a pessimistic view if no kind of explanation can be given. He has found that during ten years no less than 250 American iron bridges have completely broken down, sometimes the failure involving serious and fatal accidents. We have no such alarming record in this country, and one would have wished fuller particulars of the failures than Mr. Thomson gives. It appears that in two-fifths of the cases the cause of failure is uncertain; and in one-fourth of the cases the accident was due to derailment of the train, which, striking some principal member of the bridge, caused its failure. Now Mr. Thomson may be right that an English riveted bridge would carry a derailed train better than an American bridge. If it is so we may rejoice without too much pluming ourselves on our greater foresight. Because I don't think we generally take account of stresses due to a derailed locomotive in designing our bridges. At any rate, I think the blame of an accident of that kind must be shared by the permanent-way engineer and the engineer responsible for the carriage axles, and not solely attributed to the bridge designer's too great trust in applied mechanics. But there are specific points in Mr. Thomson's paper to which I should like to refer, as illustrating the relation of theory and practice. It is always from an adverse critic that we learn most, and Mr. Thomson in this paper plays the *rôle* of adverse critic of theory, although I have no doubt he is far too scientific himself to mean his criticisms to be taken quite as literally as he puts them. First of all, Mr. Thomson discusses the prime cause of one-fourth of the accidents—the failure of axles causing derailment. He points out that American axles are normally loaded to a stress of 15,000 lbs. per square inch, or, say, 6½ tons per square inch. As the stress in an axle is reversed at each revolution, the range of stress to which the outside fibres of the axle are subjected is 13 tons per square inch. Now, Mr. Thomson next quotes a very interesting fact. He says that a number of axles which had done a record of 95,000 miles, or as I count made about 60,000,000 revolutions, were carefully tested at the Watertown Arsenal, and according to laboratory tests, the iron was uninjured. On the other hand, merely practical and unscientific tests by a falling weight showed that all axles were so seriously injured after two years' service that they usually broke after two blows. Mr. Thomson uses this result to throw doubt on the value of laboratory or scientific testing, and asks the question; "What can the laboratory tests teach us regarding the pathology of axles?" Now it is really not quite fair that Mr. Thomson should totally ignore the purely laboratory experiments of Wohler, published as long ago as 1871, which showed that no iron could be trusted permanently with a stress of 6½ tons constantly reversed. At any rate, that with a range of stress little greater than this, all bars broke with a limited number of repetitions of loading. Wohler showed exactly how to make the proper laboratory experiment on the endurance of the iron of such axles. Laboratory experiments like Wohler's have been carried on continuously during 20 years, and we are at last getting to understand what Wohler's striking facts meant. It is to extremely refined laboratory researches at Munich that we know something of the cause why a varying maximum limit of stress must be adopted for different cases in which the range of stress varies continually. I venture to say that the laboratory results are quite in accordance with practical experience.

I have had some opportunities lately of trying whether in ordinary laboratory tests we could detect any symptom of the fatigue due to long repetition of loading in old material. I am not quite sure that simple tension testing is appropriate to detect fatigue. But it has appeared to me that in old material, with sufficiently refined laboratory measurements, one does notice this fact. The elastic limit of the old material is exceptionally low, and not widely different from the stresses to which the material has been subjected. So far as I can judge from Mr. Thomson's account, American engineers have too much ignored the scientific knowledge we have of the endurance of railway axles, and I object to this state of things being made into an argument against too much trust in science. Another of Mr. Thomson's cases is specifically brought forward as an example of the error in relying on mere mechanics. A bridge of 215 ft. span fell seven years after erection, causing a serious accident. Mr. Thomson says that the designer sank in the quicksand formula,

$$\frac{\text{Stress per diagram}}{\text{Unit stress}} = \text{section required.}$$

Mr. Thomson gives no clear account of why the bridge fell. He says it was probably due to overloading. If that is the case, surely it was the data given the designer, not his applied mechanics or his quicksand formula, which led to the catastrophe. Or perhaps it may have been the same neglect of the knowledge we have of the proper limits of stress. Any way, I should like to see what would happen to bridges, the designer of which paid no attention to the so-called quicksand formula. I look for more conclusive cases, but I cannot find them. There is one case not described in any careful report, but in a paragraph clipped from a newspaper. This is called a case of a cow, and the newspaper writer suggests that the cow swung its tail against a post when the train was passing over. Really this is like the old apocryphal story of Poncelet's bridge, which broke down because a shower of rain fell during the testing. Of course one does not doubt Mr. Thomson's experienced judgment that the questions of the best type, the limiting stress, the proper allowances for loading in American bridges require reconsideration. Only one must not take too literally his view, meant probably half humorously, that American bridges fail because they are built too scientifically. Read, however, Mr. Thomson's paper carefully, and I am sure you will profit by it.

The Electric Motor on the Elevated Railroad.

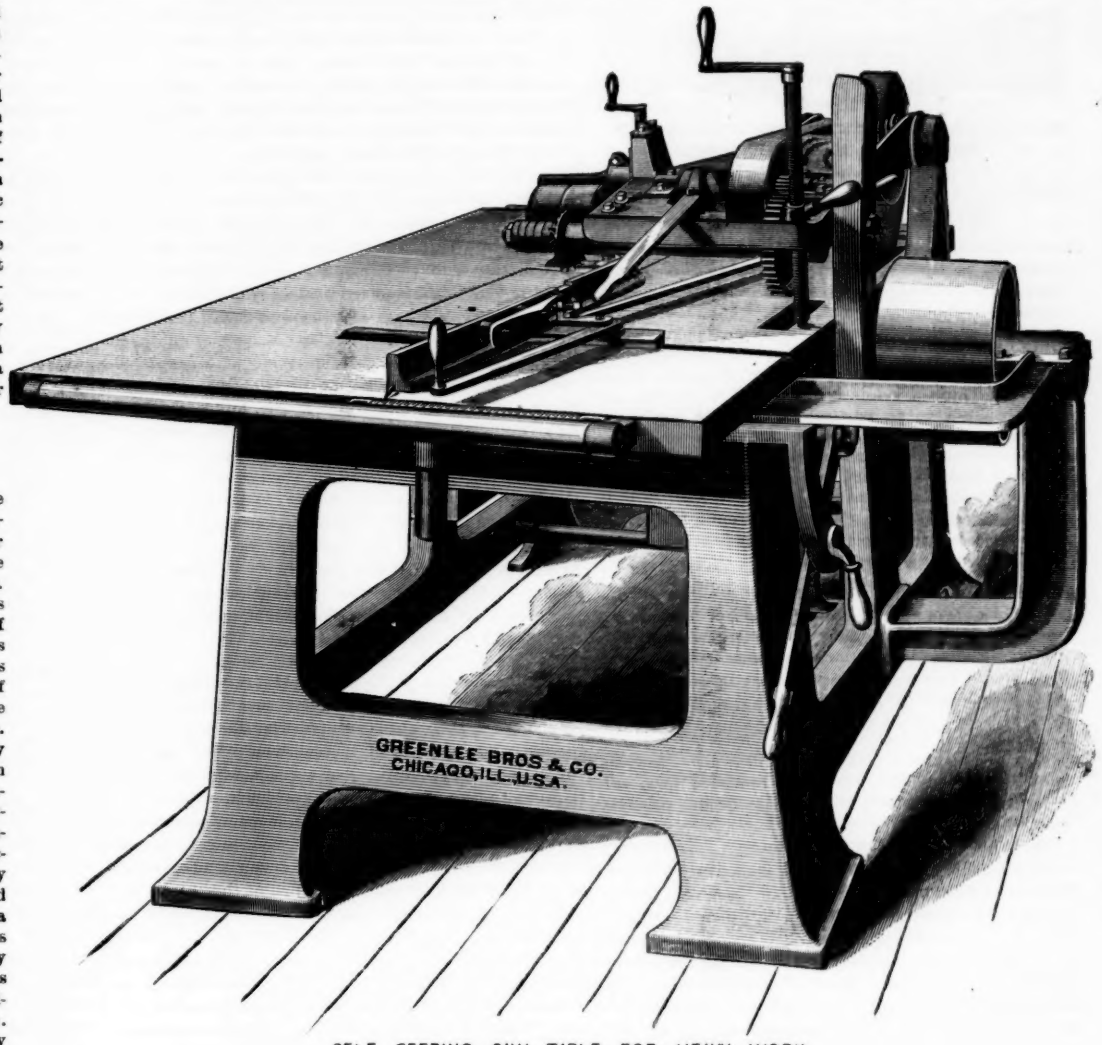
About 75 invited guests were present at the second public experimental trip of the electric motor "Benjamin Franklin" on the evening of Dec. 5. The motor has been remodeled by the Daft Co. since the tests made some months ago, and it is now more nearly adapted to the requirements of the train service on the elevated roads. It weighs 9 tons, about half the weight of the steam locomotives now used. Four cars were hauled, and although only partially filled, the motor did not get up speed with the promptness of the locomotive. The round trip was made from Fourteenth to Fiftieth street on the Ninth avenue line. The motor ran quietly, but in climbing the grade seemed to lack power and adhesion. The speed was not equal to that usually attained. The result appeared to be highly satisfactory to those who were interested in the experiment.

Colonel Haln, who was present, did not feel warranted in

predicting that the system used would be equal to the demands of the service. He believed that it would not be good policy to depend upon a central station and a common electric conductor for a number of trains. Practice had demonstrated the necessity of an independent motor for each train, and it was his opinion that some plan of operating trains independently would be necessary in order to equal the reliability of the steam locomotive. He had no doubt that an electric motor could be built to handle the trains satisfactorily, but that it must equal in weight the locomotives now used. For tramways and light suburban traffic, however, he believed that electricity would prove desirable. It was stated that a shuttle train will be operated for a time by electricity, over that portion of the line from 14th to 50th streets, which is fitted up with a ⅝-in. copper oneductor, the rails being used for the return.

Greenlee's Self Feeding Saw Table.

This class of machine was introduced by the makers some seven years ago. While large numbers of railroads and car works are using their lighter machines, they are not adapted to the heaviest class of ripping, such as car timbers, etc. They have brought out this machine to meet this need and guarantee it for the heaviest class of ripping up to 12 in. timbers. It has three rates of speed, so that it will also saw this stock as rapidly as desired. The mandrel has a gang of collars and is very long, so that two saws can be used in a gang for ripping siding, flooring, etc. The machine is all iron and steel, and built very heavy and strong in every particular. The iron top of the table can readily be raised horizontally by the lever at the side, being counterbalanced. The gauge is thrown and locked instantly by simply handling the lever in connection with it. The feed can be stopped quickly by the lever on the feed frame, and the shield over the saw is raised in planed guides with a screw. This shield absolutely prevents pieces from flying back from the saw, and also injury by coming in contact with it. The machine has also an adjustable steadying pin to prevent vibration of large saws. It will carry a 32 in. saw, which will rip 12⅝ in. The driving pulley on arbor is 12 in. diameter and 8½ in. face.



SELF FEEDING SAW TABLE FOR HEAVY WORK.

Made by GREENLEE BROTHERS & CO., *Chicago, Ill.*

THE SCRAP HEAP.

Railroad Hospitals.

A correspondent of the St. Louis *Globe-Democrat* prints an interesting interview with Dr. W. B. Outten, chief medical officer of the Missouri Pacific, who has charge of the hospitals and surgeons of the entire Missouri Pacific system. The six thousand miles of the company's road is divided into seven divisions. There are hospitals at St. Louis, Independence, Atchison and Fort Worth. The hospital system was started on the Missouri Pacific in 1879, having been planned in imitation of the similar undertaking on the Central Pacific, which was begun in 1876. Every employé earning over $50 per month contributes 50 cents a month; those receiving less wages pay 25 cents. The attempt to support the hospitals by voluntary assessments was tried on the Central Pacific, but proved a failure. Missouri Pacific employés resort to the hospitals for treatment for sickness as well as for injuries, and are furnished with transportation to and from the nearest hospital whenever necessary. They of course receive in many cases, probably most, much more skillful attention and nursing than they could secure in any other way, the road running through a sparsely settled country. Jay Gould pays the 50 cents assessment every month. This is a rather small percentage on his salary, but, on the other hand, his residence being off the line of the road, he would be obliged to pay his fare to reach one of the hospitals. The hospital in St. Louis has cost, without furnishing, $65,000, and receives 1,000 men per month in the summer. The company has surgeons at various points along the line of road, 248 in all. Large quantities of medicines are sent out to employés at their homes who have written asking for advice. Some days 200 prescriptions are sent from St. Louis to points on the St. Louis, Iron Mountain & Southern. The men on this road seem, for some reason, to appreciate the benefits of the hospital more than those on other lines. Dr. Outten says that Western roads aggregating 30,000 miles now have more or less elaborate hospital systems. The Missouri Pacific issues 10,000 passes a year for sick employés. Sisters of Mercy are largely employed as nurses. Ordinary women were addicted to sneaking out nights, leaving their charges to look out for themselves, and male nurses drank up large quantities of expensive brandy. Whether the sick brakemen in the hospitals gave these nurses "points" as to the best method of securing the high-priced brandy is not stated.

The Milford Haven Route.

At a meeting of the Milford Haven Railway Co. in London lately, the chairman announced that a strong London syndicate was forming a company to run an independent line of steamers between Milford Haven and New York.

New Shops.

The Southern Pacific recently purchased 60 acres of land in East Los Angeles, Cal., as a location for locomotive shops. Plans have been drawn for 15 large brick buildings, including machine shops, paint shops, carpenter shops, foundries, etc. Work is expected to begin about Jan. 1.

A Surfeit of Luxuries.

A contemporary voices a sentiment in which many railroad editors will join when it says: "We expected to say a few words upon the improved train service of a western road, but find that every line in that country has the fastest solid vestibuled trains, with steam heat, electric lights, barber-shop, bath-rooms, dining rooms, parlor, kitchen and cold storage; and we cheerfully recommend the Cyclone Flyer, the Lightning Hustler, the Blizzard Catcher, the Cannon-Ball Duster, as trains worthy of your patronage. You pay your money (for a *Pathfinder*) and take your choice."

The Baggage-Master's Joke.

If the Trunk lines are not checked, they will soon be strapped.—*Pathfinder Guide.*

Brazilian Roads.

A dispatch from Ottawa, Ont., states that a syndicate of American and Canadian capitalists is negotiating with the Brazilian government for the construction of extensive railroad lines in that country.

Turkish Railroads.

A dispatch from Constantinople states that the Porte has signed a convention with J. & W. Seligman & Co., of New York and London, providing for the building of railroads to connect the Turkish and Greek lines. It rejected, for political reasons, the English, German and French tenders to carry out this project. About £5,000,000 is involved in the contract.

Information from an "Esteemed Contemporary."

Two mammoth locomotives, the A. R. Darwin No. 1 and A. R. Darwin No. 2, built for the Atchison, Topeka & Santa Fe Railroad, began their trial trips last week on the route between Providence and Groton, Conn. (opposite New London). Each locomotive carries three boilers, two engineers and two firemen. The engineers sit high up in a cab in front of two of the boilers, while the firemen are some 25 ft. behind them and about 4 ft. lower down. These ponderous engines are guaranteed, it is said, to draw 30 freight cars at the rate of 80 miles an hour.

TECHNICAL.

Strength of Welded Wire Ropes and Wire.

Some tests have recently been made by Herr A. Martens under the direction of the German Minister of Public Works. The wire rope samples, from which the test pieces were taken, were of various constructions, as follows:

(*a*) A wire rope, in various pieces, consisting of six strands each of six wires with hemp core and hemp packing in the strands; steel wire 2.5 millimetres in diameter (0.1 in.) and with a tensile strength of about 130 kilogrammes per square kilometre (82 5 tons per sq. in.).

(*b*) Two wire ropes and one strand of different construction: One rope with six joints at distances of 1 metre (3.28 ft.), each strand containing a wire with a single weld; the rope made up of six strands, each consisting of seven wires, one of which formed the core, the principal core of tarred hemp; iron wire 3.2 millimetres (0.128 in.) in diameter. A second rope with six joints at distances of 1 metre, each strand containing a wire with a single weld; the rope constructed in the same way as the first, but with steel wire 2.5 millimetres (0.1 in.) in diameter. One strand constructed of six wires 2.6 millimetres (0.102 in.) in diameter, each with one weld distributed in six places, 1 metre apart, and a seventh unwelded wire as core.

Besides these, several samples of wire of various sizes from previous experiments were tested unwelded and welded in different ways. The tests were carried out on the Werder testing machine. The load was increased in the steps of about 3 tons per square inch each on the total section of the wires, commencing with one ton, in testing the ropes. Three methods of measuring the elongation of the test pieces were employed. The weight of the ropes and the weight per lineal meter was ascertained before the tests, the circumference of the ropes was measured in several places and the diameter of at least ten wires determined at each end. Ropes of the same construction, but with various arrangements of the joints and welds, were tried. In some cases ropes which had previously been tested were again experimented on with the same loads.

The following results were observed. In the case of a new rope, not previously loaded, every increase of stress produced a small permanent extension; on repeating the tests this did not again occur, but the extensions were almost exactly proportional to the loads. When at the second test the load exceeded the maximum previously attained, a permanent set was observed. In those test pieces in which the welds were distributed over a length of about 500 millimetres (say 20 in.), there was no appreciable diminution of the strength as compared with test pieces without welds, even when one-sixth of all the wires were welded in one section. In those ropes, however, in which the welds were all in one place, the strength was reduced by about 33 per cent. The extension of ropes having joints in every case proved to be less than that of ropes without joints, the extension of that with one joint being the least. The form of weld was found to have a considerable influence on the strength of the wire; generally the longer the weld the greater the strength. For the purpose of manufacturing wire rope it is not merely the absolute strength of the weld that is of importance, but also that the latter should be of such a character as to insure the maximum flexibility of the wire.

Boiler Explosions.

Mr. J. M. Allen, in a lecture delivered at Cornell University, stated that there were 992 boiler explosions in the United States during 1886, 1,500 persons being killed and property to the value of about $3,000,000 being destroyed. These explosions he attributed to overpressure, improper material or construction, or careless management. Other theories of the cause of boiler explosions, for example, that boilers were exploded, electricity generated within them, by injecting cold water upon overheated plates, by the decomposition of steam and by superheated water, have been advanced, but have all been disproved by experiment. Mr. Allen says that "a well-constructed steam boiler cannot be exploded except by great force," and concludes with the remark that "boiler explosions are mainly due to inferior quality of material, faults in type, poor construction and ignorance and carelessness in management."

Russian Locomotives.

A correspondent of *Industries'* writes to that journal that the Russian Minister of Ways of Communication proposes asking for a credit of 9,300,000 roubles for a purchase of 300 locomotives, at an average price of 31,000 roubles each. This, at the nominal value of the rouble, 75 cents, would make their cost $23,250 each, and the total sum sufficient to purchase over 700 locomotives in this country. The value of the paper rouble has risen from 38.6 cents in February to 46 in June, and a fair average value for that time is very near 41 cents. This would bring the cost of the engines to $12,710 each. These engines are all to be built in Russian shops, and an order for 20 has already been placed.

A Heavy Piece of Freight.

The Chicago & Grand Trunk has received at Chicago what is claimed to be the largest single piece of freight ever handled by a railroad. It is the granite monument for the late John Wentworth, and was shipped from Hallowell, Me. The stone is 60 ft. long, 6 ft. square at the base, and weighs 60 tons. It is stated that two specially constructed platform cars were used: but if the weight was nearly or quite equally distributed, as it probably could have been, the load was not excessive for some cars in regular service

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The complete solution of the car heating problem must include regulation of the heat and ventilation. There are a good many other conditions to be met also. The successful system must furnish sufficient heat, and must be reasonable in first cost and cheap in operation and maintenance. It will need also to be workmanlike in appearance when applied to the cars, which is not the case with much of the piping now done. A very moderate pressure of steam must be sufficient; and an acceptable coupling must not leak or deteriorate fast under steam or burst or blow off. It must couple handily and uncouple automatically. The condensed water must be so disposed of that it will not freeze in the pipes or cover station platforms and yard tracks with ice. The interest in this matter is such that great improvement in details is sure to be made this winter, but the disposition of the railroad mechanical officers of the country to introduce continuous heating will not become general until they are satisfied that the systems offered fulfill satisfactorily the conditions which we have stated. Meanwhile hardly any attention has been given to the methods of automatically regulating the heat in cars heated by continuous systems, and of ventilating them. For this winter and for some winters to come most of those who travel by rail will have to depend for fresh air and moderate temperature upon the functionary whose zeal for firing up has become famous throughout the land; and if his energy in the use of the provisions for heating and ventilating which all modern cars have were wisely directed he might make his passengers reasonably comfortable. The poor service in this respect is apparently as widespread as ever. An evidently sincere newspaper complaint of overcrowding in both the common and the parlor cars of one of the best roads recently spoke of a "Turkish bath temperature in all the cars." It is certainly possible to accomplish some mitigation of this state of things. It would seem desirable to provide cars with fixed thermometers, and to instruct brakemen carefully and strictly as to the maximum and minimum degrees of heat admissible, and as to the proper use of ventilators. They should also be drilled in the arts necessary to courageously, and at the same time courteously, cope with the meddlesome passenger. With care in these particulars much can be done to increase the comfort of railroad traveling at little cost, and the public will wait with more patience for the inventors to perfect the devices which are to relegate the trainman to the baggage car and his stove to the scrap heap.

The newspaper reports of the butting collision between a Chicago, Rock Island & Pacific and a Denver & Rio Grande passenger train, on the track of the latter road at Husted, Col., between Colorado Springs and Denver, on Nov. 26, give considerable credit to the vestibules and to the continuous steam heating apparatus of the former train; and if the statements as to speed are correct, this credit is apparently well-deserved. The trains were both running at 25 or 30 miles an hour, the cause of their being on the same piece of road at the same time having been a mistake in the making or delivery of telegraphic orders. Both engines were badly wrecked, as were the baggage cars, and two men in one of the latter were fatally injured, but not a single wheel of the Rock Island cars left the track. The other train, the cars of which were heated by independent heaters, took fire and was burned up, while the Rock Island train suffered no injury from fire. The importance of ridding passenger cars of stove-fires is too well recognized to need comment here, and the benefit derived from it in this instance is no more than should have been expected; but the advantage of the vestibules seems to be worthy of special note. Apparently the chief question with people who ride in these cars will be not as to the possibility of being crushed in a splintered car, but rather as to how they shall avoid dashing their brains out against the ends of the cars or against the furniture. For, however we may rearrange the resistance or change the locality of the shock, there cannot be a collision of rapidly moving trains without a tremendous impact somewhere. If the cars are fastened together in a train so solidly that nothing can break it, the shock must necessarily be transmitted more or less completely to the passengers inside, unless, indeed, they pack themselves in wool or excelsior.

The Providence (R. I.) Board of Trade has passed resolutions protesting against the requirement of the New York & New England road that the bill of lading for the entire amount of a cotton shipment shall be surrendered upon delivery of a single bale. The road requires this and issues non-negotiable receipts for the balance. This is one of the peculiar cases where both parties seem to be in the right. Assuming that the bills of lading are made out "to order" and obtained by payment of draft attached (most of the cotton into New England moves under such bills of lading), it follows that the New York & New England is justified in demanding evidence of ownership before delivery of any part of the property. On the other hand, the owner is justified in demanding all the property covered by his bill of lading, and also that its negotiable character be continued to apply to the entire lot. Perhaps only a half dozen bales out of a hundred have arrived in the freight house. Carrier and shipper must bear and forbear in such a case. There would probably be no insurmountable objection to making the receipts exchanged for the bill of lading negotiable within certain conditions, except the care and perplexity attendant upon so elaborate a provision for a branch of business in which the number of transactions is comparatively small. The great difference between the capacity of a freight car and of a steamboat is the root of an enormous amount of bother to the railroads, and freight men would doubtless be thankful if all the Southern cotton boats were blown up or otherwise incapacitated from carrying cotton. They could then hope within a few centuries to induce shippers to make the car load the common unit of shipment, as is the case with flour.

Gates at highway crossings are a great advance over a mere flagman, as the latter is a step beyond no guard at all; but the advantages are not wholly unmixed with evil, as has been heretofore pointed out. The deceptive character of gates which assume a vertical position when open, in the erroneous impression they give to a wayfarer when the attendant is off duty was remarked upon in these pages July last (p. 459) in connection with a report of the Massachusetts railroad commissioners. A recent annual report of that board shows nearly one half of the accidents happening at grade crossings for a year to have occurred at places provided with gates or flagmen. We mention this subject now merely to call attention to the report in our department of Railroad Law, in which the Supreme Court of Maine has confirmed the position of the Massachusetts Commissioners. The latter, while expressing very decided views, naturally refrained from laying down anything in the nature of a law or standard of practice in a matter involving such perplexing questions, and, indeed, the Maine Court does not now pretend to fix a limit to the responsibility of either the railroad or the wayfarer; but that the upright gates do deceive a person, and therefore tend to relieve him of the charge of contributory negligence, is clearly recognized. It behooves superintendents to bear in mind that every gate which is provided with an attendant for but a portion of the 24 hours has a constant element of danger connected with it. In the absence of any better provision the posting of a warning in a conspicuous position serves a useful purpose. A sign to the effect that "the gate-tender at this crossing is on duty from — a. m. to — p. m. only; at other hours all persons must look out for trains" is in use on a prominent road, and is an improvement in the right direction. To be of much use such a sign must be illuminated at night.

While speaking of highway crossings we may mention a somewhat peculiar recent decision of the Railroad Commissioners of New Hampshire. Certain petitioners complained that trains unreasonably obstructed Main street in Keene, passenger trains occupying the crossing while standing at the station and freights moving across it very slowly. The commissioners, however, say

> "It was shown by the corporation that the passenger train from Boston which reaches Keene at about 11 a. m. is so long during the summer months that when stopped at the west end of the station it extends through the east end and across the street; also that a few freight trains are so long that when moving out of the yard at the ordinary speed, which is about four miles per hour, it requires three or four minutes for them to cross Main street. The board finds no practicable way in which this can be prevented by a reasonable outlay of money, and it therefore orders that the road be permitted to obstruct the crossing with the 11 o'clock train and with freight trains in motion, not exceeding five minutes at any one time."

The moral of all which is, that the road, if it desires to afford convenient access to its own station, and in general to facilitate the business of its patrons so as to forestall any inclination on their part to patronize a rival, either now or *in the future*, should seek earnestly for some way in which to extend its platform at the west end of the station. The outlay of money in such cases does not appear so unreasonable when the question is viewed broadly; and after a change is made its benefits are appreciated and enjoyed by the railroad more than by any other party.

Railroad Values under the Inter-state Commerce Act.

We give in another column an abstract of the annual report of the Inter-state Commerce Commission. It touches upon too many disputed points of railroad economy to be properly dealt with in a single issue. We shall devote our attention to-day to what the Commission says as to the effects of the act upon railroad property as a whole. This is specially important just now, because no modification of the law in favor of the railroads can be expected until its destructive effects are clearly recognized.

We did not go so far as to suppose that the Commission would urge the repeal of the pooling clause; but we thought that it would recognize and present clearly before the public the grounds on which such a repeal is urged. That the Inter-state Commerce law is not working well for the railroads just now, seems plain enough. Yet the Commission makes a surprising statement or series of statements on this point.

> "The Commission is possessed of no evidence showing that the general result has been otherwise than beneficial. * * * Unquestionably the railroad business of the country has suffered many and very severe losses during the past year. But these have not been due to the Act to Regulate Commerce. One of the most serious of them came from a strike of engineers on the Chicago, Burlington & Quincy. * * * Serious impairment of net revenue has in several cases resulted from the construction and opening of new lines of road, involving great outlay and at first producing comparatively little income. In some instances such new lines have paralleled existing roads which were adequate to handle the existing traffic. * * * More serious consequences have resulted from rate wars. During a considerable portion of the year rates have been unsettled in the Northwest, and from time to time the relations between the carriers, always sharply competitive, have resulted in destructive warfare. This cannot, however, with any justice or to any extent, be claimed to have resulted from the act."

Let us test these statements by the facts.

When the Inter-state Commerce law went into effect the railroads were enjoying a fair, though not an extraordinary, degree of prosperity. In the course of twenty months the value of their stocks has fallen to a marked degree. We have arranged the facts as to the most important securities listed on the New York Stock Exchange; omitting (1) those like Manhattan or Canadian Pacific, not directly subject to the act; (2) those like Chesapeake & Ohio, Illinois Central, Reading or Wabash, where the condition of the capital stock account has been considerably altered; (3) those whose amount of stock was relatively small. A table like this only gives approximate results, and cannot be made quite free from errors, but its general indications are distinct and important.

Of the 51 stocks in the list, 5 show a gain aggregating in round numbers $4,750,000; while 46 show a loss aggregating $221,000,000. The net loss on the whole is 216½ million dollars. The stocks quoted aggregate somewhat over 1500 millions in par value,

forming something like one-third of the total amount of railroad stock of the country. If minor stocks have changed in anything like the same ratio—and this is true of the New York stocks which we have omitted from the list for want of space—the depreciation of such property in the country amounts to five or six hundred million dollars.

Security.	Price April 4, 1887	Price Dec. 4, 1888.	Aggregate change in value, millions of dollars.
Atchison, Top. & S. F.	105⅞	53⅞	—39
Atlantic & Pacific	12⅜	7¾	— 3½
Canada Southern	62¾	51½	— 1¾
Central of N. J.	75⅞	89⅝	+2½
Central Pacific	40⅝	34	— 4½
C., B. & Q.	140½	105½	—26¾
C., M. & St. Paul	93½	61⅜	—12½
" " pref.	122	101⅜	— 4¼
C. & N. W.	121	104⅛	— 5¼
" " pref.	147⅜	137	— 2½
C., R. I. & P.	126	99⅝	—12
C., St. L. & Pitts.	20½	15	— 0½
" " pref.	48¾	34	— 2½
C., St. P., M. & Omaha	52¼	31¼	— 4
" " "	112¾	97½	— 1¾
C., C., C. & I.	65½	53	— 2
Col., Hock. Val. & Tol.	32⅝	23½	— 1
D., L. & W.	134⅞	135½	+ 0¼
Denver & R. G.	31⅝	16	— 5¾
" " pref.	64⅞	43½	— 5
E. T., Va. & G.	14	8½	— 1½
" " 1st pref.	75	65	— 1
" " 2d pref.	26⅜	20	— 1¼
Lake Erie & Western	23¾	16	— 1
" " pref.	58½	47⅜	— 1¼
Lake Shore & M. S.	96¼	99¼	+ 1½
Louisville & Nashville	67¾	53¾	— 4½
Michigan Central	93¼	85	— 1½
Mo., Kan. & Texas	33¼	12⅝	— 9½
Missouri Pacific	109⅛	69⅝	—17¼
Mobile & Ohio	18⅜	9½	— 1
N. Y. C. & H. R.	113¼	107	— 5½
N. Y., L. E. & Western	34⅞	25⅛	— 7½
" " " pref.	74⅛	59¾	— 1¾
N. Y. & New England	64⅜	38⅜	— 5
N. Y., Ont. & Western	19	15	— 2¼
N. Y., Susq. & Western	13⅜	8½	— 5½
" " " pref.	31½	30¾	— 0½
Norfolk & Western	22½	16½	— 0½
" " pref.	52¾	48	— 1
Northern Pacific	29	24¾	— 2¼
" " pref.	69¾	58¾	— 1
Ohio & Mississippi	32¼	21¾	— 2¼
Oreg. & Transcon.	35¾	25⅝	— 1½
Richmond & West Pt.	42	23½	— 7½
" " pref.	76⅛	78	+0
St. Louis, Ark. & Tex.	23¾	8	— 2½
St. L. & San Fran	34⅞	23½	— 1¾
" " pref.	70⅞	63	— 0¾
St. P., Min. & Man.	118	90½	— 3¾
Union Pacific	61¼	62¼	+0½

But why should this be attributed to the Inter-state Commerce law? First, because it is peculiar to railroad property. The miscellaneous stocks on the list have maintained themselves quite steadily while railroad stocks have been falling. There has been no commercial crisis. Manufacturers have been fairly prosperous. Volume of business has been excellent. A light wheat crop has been offset by a remarkably heavy corn crop. The fall is due to conditions which have affected railroad business as distinct from everything else.

These conditions have affected railroad business universally. We cannot use the Burlington strike as a scapegoat to account for everything. Only an eighth part of the loss in our table was on Burlington. The lines immediately competing have suffered nearly as much; the Atchison has suffered even more. But the Burlington strike should have helped the competing roads quite as much as it hurt them. The Missouri Pacific strike a year and a half previous was not followed by any such disastrous results elsewhere. The present depreciation is not to be accounted for in this way. Its causes have been general and not special ones.

Two such causes are given in the report: Rate wars and unwise construction. The Commission is of course right in this statement of causes, but it is wrong in saying that they have nothing to do with the act itself. On the contrary, they are results of the act; the former directly so, the latter indirectly. The act, by the short-haul clause makes rate wars more destructive; this the Commission admits in so many words. By the pooling clause it makes such wars more frequent. To quote the favorite reasoning of the Commission, it was "the intention of the legislative" that it should have that effect. The combination of the two things cannot fail to be disastrous to stockholders. Much of what is said about the recklessness of the railroads in meeting cut rates is most unfair to the management. If a rival cuts rates it is usually necessary to meet the cut, even at great apparent loss. Take an actual case. Suppose two roads handle competitive traffic of 100,000 tons each, on which a rate of 25 cents per 100 is a paying one, 20 cents unsatisfactory and 15 cents ruinously low. If one road drops from 25 cents to 20, and the other does not meet the cut, the former gets a positive advantage by doubling its volume of traffic, and the latter bears the full weight of the loss. It may be even better for a road to meet a cut to the 15 cent rate rather than let its rival get the whole traffic. In the great majority of instances, in spite of what the Commission may say, about the only thing to do is to meet a cut rate; and unless the agent has discretion to do this the revenues of the road will suffer. The prohibition of pools practically compels all the roads to follow suit when one road cuts rates or is strongly believed to be cutting rates.

The absence of stable agreements between rival systems also furnishes a strong inducement to reckless railroad building. If there is to be perpetual fighting, each road wishes to possess the means of making the war ruinous to its neighbor. Much of the duplication of railroad mileage in the last two years is traceable to this cause. For the railroads as a whole it is unprofitable, just as rate cutting is unprofitable; but in this case, as in the other, the reckless road is able to set the standard for all. Just as it is impossible for a nation to live peaceably when a neighbor is thirsting for military glory, so it is impossible for a railroad under the present system to mind its own business when a rival is running on fighting principles. We do not deny that many mistakes have been made by managers of sound roads who should have known better, but we are not disposed to think that the chief blame rests with railroad managers as a class. On the contrary, as long as even a minority of managers act recklessly we do not see how the present results can be avoided under the law as it now stands.

In view of these facts, when the Commission says that it "is possessed of no evidence showing that the general result has been otherwise than beneficial," we answer:

1. That railroad property has suffered severely in value since the law went into effect.

2. That this loss was peculiar to railroad business and due to causes affecting railroads distinctively.

3. That the special causes cited by the Commission are quite inadequate to account for the result.

4. That the more general causes which the Commission adduces were themselves results, and almost inevitable results, of the Inter-state Commerce act; so that the Commission, instead of shifting the responsibility, has only fixed it all the more clearly upon the operations of the law as it at present stands.

The "Instructor of Train Service."

Prominent among the reasons for patronizing a railroad, as given in its advertisements, are generally to be found good track, fine cars, safe engines and other mechanical excellences, and these features are described, not untruthfully, by some pretty grand-sounding superlatives. This "pointing with pride" is all well enough as far as it goes; but as railroad men well know, it is often possible to "read between the lines," and to see the qualifying statement that these expensive and elegant appliances are manned by poorly disciplined employés who have to work long hours in order to earn a living; in short that the *materiel* of the road has been improved more rapidly than its *personnel*. At least, this is what we could read if the general passenger agent were to write out all he knows. But there are indications that brightening of brass and inspection of wheels are not always to receive so much better attention than is given to the brightening of train dispatchers' intellects and the inspection of brakemen's behavior; and these indications are multiplying. Reforms advance along the line of *most* resistance, if we may utter a paradox; where there is greatest need of improvement, there the wise manager puts forth his best efforts. Cars and engines, brakes and signals, have reached a degree of perfection where imperfections in other directions stand out in bold relief. These imperfections, therefore, indicate the point to be attacked, and it is being attacked. Superlatives will not always have to be so scrupulously restricted to narrow departments by general passenger agents who desire to keep truth on their side. The letter from an attaché of the general office of the Savannah, Florida & Western, printed in another column, is a reminder that progress in the direction mentioned is not confined to any one section of the country, and readers will remember that some sensible remarks on inspection recently printed in these columns were from the superintendent of this road, Capt. R. G. Fleming. The letter now published is evidence that Capt. Fleming practices what he preaches.

The practice described differs from that on the other roads that have been recently mentioned in connection with this subject, chiefly in changing the inspectorship around among different men. There are obvious advantages in this, the education of the instructors themselves during the teaching process being a chief one; but the scope and value of the examinations must suffer somewhat as compared with similar work done by men who give close attention to it for long periods and who "by practice are made perfect." The statement that the questions are such as are "suggested by the experience of the members of the committee," at once raises the query whether numerous questions and other phases of the subject suggested by *general* experience ought not to be availed of. No one man, no three men, can boast of all experience; and, moreover, the experience of different men needs not only to be recognized, but to be carefully compared and studied with reference to its bearings. We mention this point, not to criticise the Savannah, Florida & Western, but to call attention to a plain truth which should be remembered by all who consider the subject.

We like the title adopted by Captain Fleming. It tells exactly what the officer does. This, with other means described by our correspondent, gives the men a clear idea at the outset of what sort of dealing they may expect. It is eminently fair that this officer should report only what he sees of disobedience or incompetency, and the men could not ask any greater generosity on the part of the superintendent. At the same time the inspector, if faithful and enthusiastic in his office, will become so alert and constantly thoughtful, and will come to have such a strict standard of efficiency, that he will naturally find more lapses than the average conductor would; and the men should not be surprised if he seems to do more than his share of tale-telling. Moreover, if he is a skillful and industrious instructor they have the privilege of learning until they are as sharp as he. We do not see, by the way, how a single inspector can "keep *close* watch" of the men on over 500 miles of road. On most roads of that size another man or two would be required, unless, indeed, the work were done as so much other railroad work is done, by slighting a large share of it.

The statement that the ambitious ones "strain a point" to attain the desired standard of qualification is suggestive, and should be noticed by all trainmen, and all other men, who hope to rise. Straining for shorter hours or more pay are perhaps the most common forms of special exertion among trainmen, but they are not the sort referred to here. *Longer* hours, so as to study their trade more profitably, must be what these men are aiming at. They are anxious, not to get more pay for what they are doing now, but to put in more time without pay, so that they may afterwards *earn* more. The truths here illustrated are old, but worth admiring when seen exemplified in real life, nevertheless. To attain a position above the average, or to enjoy rapid advancement, one must be willing to rise early and work late. No other sort of people ever achieve anything.

It will be observed from the testimony of our correspondent that the beneficial results of the new system are not vague and hard to locate, but are definite and visible. In this he only corroborates the evidence of officers on other roads which have taken similar action. The testimony of the best disciplinarians, those who are the most skillful in securing good service and the most generous and just to their men, seems to agree that the right kind of dealing leads men to treat their superior with honesty and with confidence. The question whether misdoings can be detected with sufficient strictness while at the same time dealing honorably with the men and being perfectly frank in all instructions and requirements, does not come up in any troublesome form. The superintendent who has 100, or 500 trainmen, who generally report their own blunders before any evil disposed rival or sharp-eyed detective has a chance to do so may be deemed fortunate indeed. But there are such, and their good fortune is not good fortune after all. They have brought about this state of things themselves. We should like to hear of many more such superintendents.

The New Overland Train.

The "Golden Gate Special" is now on its initial trip, having started from Council Bluffs at 8 o'clock Wednesday morning. The provision of hot water, of two bath rooms, one for ladies and one for gentlemen, and the employment of a female attendant, marks an advance upon the highly luxurious accommodations afforded on the elegant vestibule trains that have been running on various other routes for a year past; but aside from this, the chief interest in the train centres in the time schedule. We have not seen the official time-table, and are not certain whether the 64 hours from Council Bluffs means apparent time or actual running time. It is probably the latter, as, allowing for the two hours difference between Central and Pacific time, the arrival in San Francisco would be 10 p. m., which is a seasonable hour, while midnight is not. This makes the apparent running time 62 hours. The actual rate of speed on the road, including stops, is therefore almost exactly 30 miles an hour, considerably faster than the time of the "Overland Flyer," which was taken off a few

months since. The faster of the two daily trains now running takes about 78 hours for the trip, running considerably slower on the Central Pacific than on the Union.

The fare on the special is announced as "$100, including everything;" but we presume the porters, male and female, are expected to collect a portion of their wages direct from the passengers according to time-honored custom. A local paper divides the $100 thus: "Ticket, $60; berth, $13; meals, $8; style, $19, with charges for bathing and shaving extra." There is a regular first-class round trip ticket between San Francisco and Chicago good for six months which costs only $100. This is said to be much used by San Francisco business men who come East, and is so much cheaper than the rate on the special between those cities (about $226) that it is predicted the latter will be left to the millionaire tourists. Baggage will be checked only at Council Bluffs, and extra baggage above the 150 lbs. limit is excluded; so the emigrants with two big chests and a feather bed are ruled out, sure and certain. Among the fictions printed by Western papers are a scheme to provide salt water baths with water from Salt Lake, and the statement that the train will stop only about every 300 miles. Probably coal and water would be taken at stations in the wilderness "unbeknownst" while the passengers were busy playing cards. A report that may not be all fiction is to the effect that the Pullman Company has orders to continue building cars until there are enough to run a train every day. This would require from 50 to 75 cars. At present the weekly train allows passengers to leave the Atlantic seaboard Monday morning and reach the Pacific Friday night. The time between Chicago and Council Bluffs will probably be shortened when the present agreement between the competing roads expires, a month or two hence; it will then be possible, by a slight acceleration west of the Missouri, to save another day at the starting point. The additional lines now in the field controlled by a single company from Chicago far beyond the Missouri, change conditions materially, and that river is slowly but surely becoming a way station. The rumors that the Union Pacific will make an arrangement with one of the roads to run its passenger trains into Chicago will probably come true before long, whether they have any basis now or not.

A correspondent who has inspected the cars built for this much-heralded train, sends us the following account, which embraces some details not heretofore given:

"There are now in the yards of Pullman's Car Company, Pullman, Ill., two complete vestibuled trains ready for delivery to the Union Pacific. These trains will compose what is to be known as "The Golden Gate Special," a limited overland express, to be started on its first trip Dec. 5. It will run once a week from Council Bluffs to San Francisco as a solid train. The cars are the finest the Pullman Company can produce, and the style of the train is very much after the fashion of the New York and Chicago limited, illustrated in the *Railroad Gazette*, Nov. 23. It will be heated by steam, lighted by electricity and furnished with hot and cold water throughout. The car next to the engine will be a combination baggage room and barber shop with bath rooms; the next is the dining car, which is followed by two sleeping cars, and bringing up the rear is a composite car (parlor and sleeper) equipped with ladies' bath-rooms and an observation room. The rear platform of this car is not vestibuled, and the windows extend to the floor, allowing every advantage to sightseeing travelers. A large reading room is also a feature of this car, though both the sleeping cars on each train are equipped with well selected libraries. In the baggage car is an engine for charging the lighting batteries en route, steam being supplied, as it also is for heating, from the engine. The Sewall system of heating is used, in connection with the Baker heaters."

Chilian Railroads.—Operation and Control.

Through the kindness of Mr. Charles C. Greene we have received some interesting facts as to the workings of the Chilian railroad system, which may serve to supplement what we have said in recent issues as to its present and prospective development.

All the railroads of that country—state and private alike—are subject to a carefully codified law, dating as far back as 1863. This law, based on the general principles of French jurisprudence, is divided into three heads. The first deals with the conditions of railroad location and construction; the second, with operation, traffic and rates; the third with accidents. The government requires pretty accurate information of the conditions of operation, and exercises broad powers of inspection in the interests of public safety. The clauses with regard to liability are extremely well drawn, but there is some doubt how far it would be possible to enforce them, especially against the government itself.

The provisions with regard to rates are as follows:

ART. 51. The tariff which a railroad company may establish of itself or by government authority, shall be applied to all who make use of the railroad without any possible exception.

ART. 52. In the absence of charter provisions to the contrary, it is understood that freight rates are to remain in force a year at least, and passenger rates six months; and that changes must be announced sixty days in advance.

ART. 52. This shall not prevent any company from making a reduction from tariff rates in favor of such shippers as shall accept longer periods of delivery than those fixed for ordinary freight trains, nor for those shippers who shall agree to furnish a certain minimum of tonnage regularly. But such a reduction in favor of one or more shippers shall be extended to all who may demand it subject to the same conditions.

The clause in Art. 50 about government intervention seems to open the door for a great deal of trouble. But there has been no popular agitation about railroad rates in Chili, perhaps because that country is still in the period where railroad extension is more urgently demanded than railroad regulation, and we imagine that the companies have the matter of tariffs to a large extent in their own hands. Art. 52 allows freedom enough in meeting individual cases wherever there is any good public ground for a special rate. The strangest provision is that with regard to permanence of rates. Business conditions do not shift as rapidly in Chili as they do in the United States.

The tariff of the state railroads, which is the only one we have at hand, is made on good business principles. It is much more like the tariff of an American Company than like that of the state railroads of continental Europe. Goods are divided into six classes; the fourth, fifth and sixth taking in each case half the rates of the first, second and third respectively. The sixth class rates are in general about one-third those of the first. The three lower classes are chiefly, though not entirely, confined to whole car-loads. Car-loads vary from 12 to 16 metric tons (2,204 pounds each), and there is some variation as to the practice of charging actual or nominal weight on different articles. The variety of high class goods charged by measure instead of by weight is quite noticeable. Most of the tariffs are arranged on a basis nearly approaching equal mileage rates, especially for the first and fourth classes. The rates are given in Chilian currency, whose nominal value (being on a silver basis) is 80 cents to the dollar, but has been down much lower than this. They actually average about 2 (Chilian) cents per ton kilometre, or a trifle less than 2 American cents per ton-mile, after making allowances for depreciated currency. The rates per passenger-mile are a trifle less than per ton-mile. The passengers, as in most parts of Continental Europe, are carried in two classes in express trains or three classes in accommodation trains, third class accommodation fares being little over one-third of first-class express fares for the same distance.

The cars on the state lines are partly of the American and partly of the English type, the former predominating in freight service, the latter in passenger. All the American passenger cars, and, what is more remarkable, half the American freight cars, are provided with Westinghouse automatic brakes.

The organization of the service presents little which calls for special remark. The state system as a whole is under the control of a director-general, with a salary of $8,000 (Chilian currency). Under him are four special directors, in the departments of operation, construction, motive power and finance, with salaries varying from $4,000 to $7,500. The pay of officials of lower grades is proportionately small. Little independent importance is given to the traffic department. Affairs seem to have been honestly enough managed. Perhaps the best testimony of this is the rather small average cost of the Chilian railroads—considerably less than those of the United States, if we allow for the difference in currency. There is a great deal of publicity of accounts; in fact, the statistical exhibits of the state lines are given on such a lavish scale that it must form a considerable item of expense to the government.

Some of the leading results of traffic operations are as follows:

Miles operated, 1887		596
Passengers carried, 1st class	526,000	
2d "	369,000	
3d "	1,563,000	
Total		2,458,000
Average passenger journey, miles		27
Tons carried		1,340,000
Average length of haul		90

The earnings per train mile, Chilian currency, were $1.36½; the expenses, $0.85½. The average car-load was 31 passengers, or 6⅞ metric tons of freight. Figures are not in shape for giving average train loads.

Annual Reports.

New York Central & Hudson River.—The general results are as follows:

Miles owned	732
Leased	689
	—1,421

	Year ending Sept. 30, 1888.	Year ending Sept. 30, 1887.
Earnings, freight	$21,334,299	$21,143,098
" passenger	10,878,119	10,519,472
Total, incl. misc.	36,132,920	35,297,055
Expenses—Maint. of way	5,450,200	4,891,219
" Equipment	4,867,249	3,983,714
" Operation	14,398,389	13,513,690
Total	24,626,338	22,388,623
Net earnings	11,506,582	12,908,432
Fixed charges	7,831,463	7,760,924
Profit	3,675,119	5,147,508
Dividends	3,577,132	3,577,132
Surplus	97,987	1,570,376
Capital stock		$89,428,300
Funded debt		56,183,333
Other debt		7,478,856
Profit and loss		12,794,219
		$165,884,708

The great apparent reduction in the profits for the year is due chiefly to the amount of repairs charged to current account. The increase in the item of operation, in the narrower sense, is a trifle less than the increase in earnings.

Traffic statistics are as follows:

	1888.	1887.
Number of miles run by passenger trains	10,015,709	8,734,803
Number of miles run by freight trains	14,740,083	14,047,553
Number of miles run by switching and work trains	11,115,975	9,190,912
Number of through passengers	219,469	190,157
Number of way passengers	17,779,089	16,275,296
Total number of passengers carried.	17,998,558	16,465,453
Number of passengers carried one mile	559,816,001	528,308,742
Total number of tons of freight earning revenue	15,262,873	14,626,954
Number of tons railroad company's freight	1,122,573	1,085,719
Total number of tons carried	16,385,446	15,712,673
Number of tons carried one mile	2,754,778,838	2,704,732,176
Number of tons railroad company's freight carried one mile	144,722,666	134,832,125
Total number of tons carried one mile	2,899,501,504	2,839,564,301

	1888.	1887.
Earnings per ton mile cts.	00.77	00.78
Expenses per ton mile cts.	00.59	00.56
Profit cts.	00.18	00.22
Earnings per passenger per mile cts.	1.91	1.96
Expenses per passenger per mile cts.	1.48	1.34
Profit cts.	0.43	0.62
Earnings per train mile on freight	$1.43	$1.51
Expenses per train mile on freight	1.11	1.09
Profit	$0.32	$0.42
Earnings per train mile on passengers	1.07	1.20
Expenses per train mile on passengers	0.83	0.81
Profit	$0.24	$0.39
Average number of passengers per train mile	56	60
Average number of miles one passenger carried	31	32
Average number of tons carried per train mile	186	193
Average number of tons carried one mile	180	185

It will be noted that the average haul and average train loads, both for freight and passengers, have somewhat decreased, which will sufficiently account for the increased expense per unit, apart from the larger sum expended on repairs, as mentioned above.

The form and typography of the report are worthy of the highest praise.

The new locomotive, "A. G. Darwin," built by the Strong Locomotive Co., at the Hinkley Locomotive Works, for the Atchison, Topeka & Santa Fe, has been for the past two weeks hauling regular trains on the New York, Providence & Boston road, and will probably be transferred next week to some other eastern road, possibly the Erie, for further work in fast passenger service. This is not primarily for exhibition purposes, although the remarkable speed and power of the engine is attracting much attention. It is designed in this preliminary work to obtain some correct figures of work done and fuel consumed. The fire-box consists of twin cylindrical corrugated furnaces opening into a single combustion chamber. The valve gear is similar to, but differing in some details from that in No. 444, now running on the Lehigh Valley road. The engine has four coupled drivers, with a four-wheel leading truck and a pony truck under the fire-box. Some of the dimensions are: Cylinders, 19 in. × 24 in.; drivers, 68 in.; engine wheel base, 29 ft.; engine and tender wheel base, 54 ft.; length over all, engine and tender, 65 ft.; weight of engine, 60 tons. In the trials thus far the machine has not found the limit of its speed or power. It has repeatedly hauled the Shore Line express, 8 cars, at 60 miles an hour, and is evidently capable of much higher speed.

The State Supreme Court of South Carolina has rendered a decision invalidating about $1,000,000 of township bonds issued in the state in aid of the building of railroads. The suit was begun in Abbeville County. The taxpayers in a township in that county paid their railroad tax under protest, and brought suit against the county treasurer to test the constitutionality of the tax. The Circuit Court decided that the act in question was unconstitutional, and the case was carried to the Supreme Court, which sustained the decision of the Circuit Court. The decision affects the bonds of the Charleston, Cincinnati & Chicago, the Knoxville, Cumberland Gap & Louisville, the Carolina, Knoxville & Western, and the Columbia, Newberry & Laurens roads.

The six-inch gun, cast of Bessemer steel, by the Pittsburgh Steel Casting Company, burst at the Annapolis proving ground at the second shot. The first shot was fired with 36 lbs. of powder; the second with 48 lbs. and a 100 lb. conical shell, giving a pressure of 14.1 tons per sq. in. The destruction of the gun under this charge seems to have been very complete. From the trunnions to the breech it is said to have broken into more than 20 pieces. However this result may be explained, it is unfortunate for the makers, and will discourage the use of cast steel for heavy guns.

NEW PUBLICATIONS.

The Guatemala Central Railroad Company issues an attractive little publication, modestly called a folder, designed to attract excursion travel to Guatemala. A brief itinerary of the route is given, embellished by 37 photographs, which would be attractive but for the wretched printing. Concerning this it is said "the original negatives being perfect the company much regrets the poor photo-mechanical printing executed by Messrs. Blank, London." The name of Messrs. Blank is very conspicuously printed, and it is apparant that the General Agent of the road does not mean that their bad workmanship shall go unadvertised. "In order to induce travelers to and from California and Mexico to see this rich and beautiful country and its splendid railway"

special excursion rates for steamer passengers are made, from San José to Guatemala City and return, upon presentation of a certificate from the purser of the steamer showing that the holder is a through passenger.

The Alloys of Aluminum and Silicon is a descriptive pamphlet issued by the Cowles Electric Smelting & Aluminum Co., of Lockport, N. Y. It contains descriptions of the mechanical properties, working qualities and uses of the aluminum alloys and of siliconized copper and silicon-bronze. Several valuable tables of comparative tests are given, and letters from those who have used the various products of the company are appended. Not the least valuable part of the pamphlet is a list of papers on aluminum which have appeared in the technical journals within the last four months.

TECHNICAL.

Locomotive Building.

The Baldwin Locomotive Works, of Philadelphia, have this year delivered 654 new locomotives. This is the largest production in any year since the works have been in existence, and by the time it closes, they will have delivered over 700. The contracts have included 50 locomotives for the Pennsylvania and 60 for the Philadelphia & Reading. Five locomotives have been shipped to the Dom Pedro Segundo Company in Brazil, and 30 to the Provincial Company, of Buenos Ayres.

The Wabash is building several locomotives at its shops in Fort Wayne, Ind., and last week turned out a new passenger engine.

The Baldwin Locomotive Works have received a contract from the Argentine Republic for the construction of 30 freight, passenger and switching locomotives, to be delivered early next year. The works filled a large contract for locomotives for the Argentine Republic in 1882, 1883 and 1884.

Car Notes.

The Cleveland, Columbus, Cincinnati & Indianapolis is in the market for 700 box cars of 50,000 lbs. capacity.

The Chicago, Burlington & Quincy has awarded a contract to the Indianapolis Car & Manufacturing Co. for the building of 1,000 box cars. This contract, with others already received, will keep the works busy until spring.

The Ellis Car Manufacturing Co., of Amesbury, Mass., has put in place nearly all the machinery for its new works and will soon commence the erection of steel cars.

The Elliott Car Co., of Gadsden, Ala., has received an order for 100 furniture cars for the Cincinnati, New Orleans & Texas Pacific.

The Burton Stock Car Co. is building, at its works at Wichita, Kan., 300 stock cars. When these are completed, the company will have 1,200 of its cars in service. The company is also constructing 25 "Perfected" horse cars of the same pattern as the 15 recently completed.

Bridge Notes.

The Wabash has just completed a bridge over Stony Creek, near Danville, Ill. All the important new bridges which it is now building are made wide enough for a double track.

Sealed proposals will be received until Dec. 24 for constructing a railroad line in the Watervliet Arsenal Grounds, at Troy, N. Y., and for building a wrought iron bridge over the Erie Canal, with masonry abutments. Information can be had on application to Col. J. M. Whittemore.

The Board of Freeholders, of Trenton, N. J., have advertised for estimates on the proposed new bridges at Southard street and Lincoln avenue, the former to be 324 ft. long, and the latter about 700 ft.

The new Franklin avenue bridge at Minneapolis, Minn., which was commenced a year ago, is 1,000 ft. long, and has one through span of 300 ft., and four deck spans of 175 ft. each. The through span is 80 ft. above the river. The bridge has cost about $140,000.

The La Crosse Bridge & Transfer Co. has filed articles of incorporation in Wisconsin, with a capital stock of $100,000, to build a bridge over the Mississippi River at La Crosse.

The St. Louis Bridge & Iron Works have been awarded a contract for a single-span iron bridge, 120 ft. in length and resting on iron piers, for Loutre Creek, in Montgomery County, Mo. At Florida they are erecting a three-span bridge over Salt River, each span being 140 ft. in length.

The Long Span Bridge Co. has been chartered in Kansas by Gustav Lindenthal, Henry Miller and others.

The Quincy Street Bridge Co., which proposes to construct at Topeka, Kan., a tubular iron pier bridge, 1,000 ft. long, with stone abutment and 20 ft. roadway in the clear, the structure to be completed Dec. 31, 1889, has made a proposition to the city to convey the bridge to the city ten years after completion, if the city will lease it during this time at annual rental of $12,500. The bridge is to cost $125,500. Samuel Dolman is Vice-President of the company.

The Elmira, Cortland & Northern has awarded a contract to a Philadelphia firm for an iron trestle to replace the timber structure at Mott's Corners, near Ithaca, N. Y. The contract price is $40,000.

Work is in progress on the iron superstructure for the upper town bridge at St. Paul, Minn., and work is progressing on the pier foundations for the new section of the Wabasha street deck-bridge. The section to be immediately rebuilt extends from the end of Wabasha street to the island in the river. All the old piers from the river bank to the island will be removed, and this part will be rebuilt in three spans instead of four. This gives a channel span of 280 ft. instead of 240 ft. The width of the new part will be 56 ft., 36 ft. for roadway. It is intended to have the new piers completed by Jan. 1, while the superstructure will be finished by June 1, 1889. The Marshall avenue bridge across the Mississippi is approaching completion. The University avenue bridge, over the Minnesota Transfer tracks, will be 60 ft. wide and 1,050 ft. long, including trestle approach. The State street bridge of the Chicago, St. Paul & Kansas City Railroad is in progress, and the Mississippi street bridge over the St. Paul & Northern Pacific is completed. The railroad bridge at Merriam Park will be completed this season, and the Dale street bridge will be built early next year.

The Nebraska & Dakota Bridge Co. has been incorporated at Lincoln, Neb., to construct a bridge over the Missouri River, near Ponca, Neb.

The following proposals for the construction of a three-span viaduct at Thirty-fifth street, Chicago, were opened by the Commissioner of Public Works: A. Gottleib & Co., Chicago, $63,344; Chicago Forge & Bolt Co., $63,850; Ritter & Conley, Pittsburgh, Pa., $65,341; Detroit Bridge & Iron Works, $68,400; Pittsburgh Bridge Co., $69,935; Keystone Bridge Co., Pittsburgh, Pa., $73,500. The contract was awarded to A. Gottleib & Co.

The following bids for constructing a bridge at Tia Juana, Cal., were received by the Board of Supervisors: J. Pickett, San Diego, $1,075, 200 ft. bridge; J. N. Lorson, San Diego, $1,340, 238 ft. bridge; R. A. Doss & Son, National City, $1,079; Burkhort & Johnson, San Diego, $1,453; T. C. Bishop, San Diego, $1,315; E. C. Emery, Luatay, $1,453; W. E. Baines, San Diego, $1,381; Drury Bros., San Diego, $1,184; S. F. Risdon, National City, $1,285; R. E. Osgood, San Diego, $1,149; John McAllister, San Diego, $1,175; Proctor & Marriage, San Diego, $1,195. The contract was awarded to R. A. Doss & Son.

The following proposals for the erection of the North Ferry street bridge at Albany, N. Y., were opened by Superintendent Shanahan: Cassidy & Gallagher, Albany, $2,487; Valentine Brown, Mohawk, N. Y., $2,116; Daniel Sturtevant, Sandy Hill, $3,853. The contract was awarded to Valentine Brown.

Work has begun grading the approaches for the new Atlantic & Pacific bridge at the Needles, Cal., 8 miles below the present crossing. The bridge will be steel, and will span the Colorado River at a height of 85 ft. It will rest on two river piers. The bridge will probably cost $350,000.

A railroad and highway bridge to cross the Mississippi River at New Orleans is projected by E. L. Corthell and others. It is proposed to have one pier in the centre of the river, and the cantilever principle will be employed. The bridge will be made high enough to allow boats to pass beneath it at the highest stage of water.

The belt line bridge over the Savannah, Florida & Western tracks at Habersham street, Savannah Ga., is being built by G. H. Crafts, of Atlanta, Ga. The bridge will be of iron, 120 ft. long by 14 ft. wide, with iron supporting columns. It will be 20 ft. above the tracks, with trestle approaches.

A bill has passed the Vermont Legislature authorizing the construction of a bridge from Grand Isle to North Hero, and also authorizing the towns interested in the building of the bridge to appropriate $20,000 to aid the enterprise.

The new Chicago & Northwestern Railroad bridge across the Missouri River at Sioux City, Ia., was tested and formally opened to traffic Dec. 5. Nearly a hundred railroad men were present from Chicago, Omaha and St. Paul. The bridge cost $1,500,000, and has been about 17 months building.

Manufacturing and Business.

The Eames Vacuum Brake Co. announces that it will at all times protect its customers in the use of its manufactures as against any or all claims, such as suits for infringements of patents, etc., and will, whenever desired, furnish a guarantee to that effect.

The M. C. Bullock Mfg. Co., of Chicago, Ill., among recent important shipments report the following: To the Oregon Railway & Navigation Co., Riparia, Wash. Ter., two 12 × 18-in. straight line air compressors; to Fairbanks, Morse & Co., Chicago, Ill., one Williams compound condensing engine; to the Bowers' Dredging Co., San Diego, Cal., one centrifugal dredge and conveyor.

The Page Belting Co., of Concord, N. H., has established an office at No. 17 Federal street, Boston, under the management of Mr. J. P. Jewell, and will keep there a full line of goods for the New England trade. The company's business for last October was 30 per cent. more than for the same month last year.

The Wainwright Mfg. Co., of Boston, is manufacturing a special horizontal feed-water heater of 1,400 h. p. capacity. This heater was ordered by the Wm. A. Harris Steam Engine Co., of Providence, R. I., and will be installed, when finished, in the steam plant of the Sagamore Mills, Fall River, Mass.

The Railway Track Lifter Co. has been incorporated at Augusta, Me., by O. D. Baker, and others. The capital stock is $150,000.

The New Jersey & New York shops, at Hillsdale, N. J., have lately been extended to twice their usual size. A new 40 h. p. engine has been added, two new lathes, and a quantity of other small machinery.

The New York, Lake Erie & Western car shop at Jersey City has recently received a new 22 ton lathe.

A site has been selected at Anniston, Ala., for the erection of the car springs works of the United States Rolling Stock Co.

The Thomson Electric Welding Co. is building new shops in Lynn, Mass. The main building is 242 ft. × 87 ft. Power for the shops will be furnished by a pair of Greene engines, 42 × 20, to run 100 revolutions per minute, which will be built by the Providence Steam Engine Co., of Providence, R. I. The boilers are of steel and will be furnished by the Cunningham Iron Works, of Boston. The buildings are of brick, with granite trimmings.

The Johnson Electric Supply Co., of Boston, has recently leased a large building on Mount Washington avenue, where it will manufacture a storage battery which, in construction, is said to be a radical departure from any made at the present time. The company has on hand orders to equip several large buildings.

The Salem Foundry & Machine Co. of Salem, Mass., have recently shipped 3 freight elevators to Oldtown, Me., 2 to New Bedford, 2 to Lowell, 1 to Windsor Locks, Conn., and have about ready for shipment 2 for Spartanburg, S. C.

Iron and Steel.

The Henderson Steel Co., of Birmingham, Ala., last week shipped to Chattanooga two car loads of medium hard steel to the Lookout Rolling Mill Co., to be used by that company in making car and locomotive springs.

James P. Witherow has contracted for the construction of a large blast furnace for the Jefferson Iron Works, at Steubenville, Ohio. The furnace will be 18 × 80 ft., and will cost about $60,000.

The Pennsylvania Steel Co. will build steel works to consist of three 12-ton converters at Sparrow's Point, Md.

Ground has been broken in Joliet, Ill., for the erection of steel-plate works near the Joliet Steel Co.'s mills. The new plate-works will manufacture car-trucks for both passenger and freight cars under the Fox patents.

The Duluth Iron & Steel Co. is now at work on its furnace at Duluth, Minn. The casting house and engine house have been finished except the roof, which is being hurried to completion also.

All the departments of the Bessemer steel plant of the Bethlehem Steel Co. went into operation this week.

Charles Huston & Sons, iron and steel manufacturers, will erect an immense new steel mill near their present works at Coatesville, Pa.

The Valley Iron Works, belonging to Mr. Kurtz, of Philadelphia, which have been idle, are being enlarged and improved, and will be in operation after Jan. 1.

The North Chicago Rolling Mill Co. has given notice of a 15 to 20 per cent. reduction in the wages of employés in the blast furnace at South Chicago, Ill. The employés objected to the reduction, and the matter has been placed in the hands of a board of arbitration and an umpire, whose decisions will be binding upon both employers and men.

The Katahdin Iron Co. is now owned by F. W. Hill and Charles D. Stanford, and will soon be running at the full extent of its capacity. The same parties will probably secure a lease of the Piscataquis Iron Co.

The Bluffton Iron Ore Co. proposes building a furnace at Bluffton, Ala.

Carnegie, Phipps & Co., Limited, contemplate the erection of three additional open-hearth furnaces at the Homestead Steel Works, Homestead, Pa.

The Apollo (Pa.) Iron & Steel Co. is to erect an additional sheet mill, and possibly an additional steel furnace.

The Keystone Rolling Mill, in Reading, Pa., shut down this week for a month, throwing 125 men out of employment.

The Philadelphia & Reading has purchased the property of the Allentown (Pa.) Iron Co., on which will be located the terminal which the company will build as a connection between the East Penn and Central of Jersey roads through Allentown. The property purchased contains three blast furnaces, two of which are in operation. George F. Baer, of Reading, Pa., has been elected President of the iron company, and Albert Broden, Superintendent of the Coal & Iron Co.'s furnace, was chosen General Manager of the Allentown Iron Co.

The Rail Market.

Steel Rails.—No large orders have been received by the Eastern mills, and there is very little business in sight. The Western mills are taking all business in the West, and very low prices are made in the South. Pittsburgh and Chicago mills have closed sales aggregating about 30,000 or 35,000 tons. The prices are not made public. A Southwestern system is reported in the market for a large order. It is thought that the low prices which have been ruling for some time will be speedily advanced, and it is asserted that $28 at Pittsburgh and $29 at Chicago are the lowest price for rails at those places. Four Eastern mills and two Western concerns are turning their steel product into other channels; two mills have booked enough rails to keep them out of the market for the present, and two are entirely idle.

Old Rails.—A sale of 700 tons at private terms is the only business reported. Quotations are nominally $23.25@$23.50.

Car Heating Notes.

The Cheshire (N. H.) road is fitting up three passenger trains with the Sewall steam-heating system. The trains on the Rutland division of the Central Vermont will be fitted with the same system soon.

The Martin system has been adopted by the Northern Central.

The Boston *Herald* notes the fact that one can now travel from Boston to Los Angeles, Cal., in cars heated with steam from the locomotive. The route is over the Boston & Albany, New York Central, Lake Shore, Chicago, Santa Fe & California, Atchison, Topeka & Santa Fe and Atlantic & Pacific. The traveler would probably have to be careful in selecting his train over some portions of the route.

A New Worsdell Freight Compound.

Mr. T. W. Worsdell, Locomotive Superintendent of the Northeastern (England), has just put in service a new class of compound locomotive for freight service. This engine has six coupled wheels, 61¼ inch dia. on tread, and a pair of radial trailing wheels. A supply of coal and water is carried by the engine itself, dispensing with a separate tender. The engine is thus shorter, handier, and cheaper than a tender engine of the same tractive power, while the amount of coal and water carried is amply sufficient for short journeys or for switching purposes. The cylinders, wheels, motion, etc., are interchangeable with those used on the main line freight engines with a tender. The total wheel base is 22 ft. 6 in., and the total length of frames between buffer or bumper beams is 32 ft. 3 in., or fully 15 ft. shorter than an engine and tender of the same power. The engine is inside connected, the high-pressure cylinder being 18 in. dia. by 24-in. stroke, and the low-pressure cylinder being 26-in. dia. by 24-in. stroke. The working pressure is 160 lbs. per sq. in. The weight on the drivers with tanks and coal bunker full is 101,600 lbs., and the total weight of the engine is 121,000 lbs. The capacity for water is 1,560 gallons and the coal bunkers hold 4 500 lbs. The total heating surface is 1,136 sq. ft., and the grate area is 17.23 sq. ft. All the axles and the boiler and fire box shell are steel, and the wheel skeletons are cast steel. The inside fire-box is copper and the tubes brass. Joy's motion and the Allen or Trick Valve is used. The latter has 1½ in. lap and 5½ in. full travel. The engine will be employed in hauling coal trains consisting of 40 four-wheeled cars, each holding 10 gross tons. The total weight of train, including engine and caboose, is about 1,570,000 lbs. It is estimated that when working with a three-fold expansion the engine would exert a tractive force of about 17,000 lbs., and would therefore be capable of hauling this train up a grade of 40 ft. per mile.

Johnson's Cable Road Yoke.

This is a cast iron cable yoke, designed by Prof. J. B. Johnson, of Washington University. He tested a great many cast iron yokes, of different patterns, and found them all weak and flexible against lateral pressure, tending to close or diminish the width of the slot opening. On a careful study of these yokes, he concluded that they were all theoretically defective in design. An entire class of strains were unprovided for. He then designed a yoke which shows, by actual test, from three to five times the strength, and from five to eight times the stiffness of any of the ordinary forms of yokes. These results are obtained with from the same to thirty per cent. more metal than is used in the old forms. When cast in silicated iron, the strength of the yokes was still further increased. The exclusive right to the privilege of manufacturing and using these yokes has been secured by the Mullins Silicated Iron & Steel Co.

Forney Engines in Mexico.

The Federal District Street Railway Co. of the City of Mexico, after estimating carefully the expenses of electricity as a motor for its suburban lines, has determined to adopt the Forney type of locomotive, which the *Mexican Financier* says "is notable for swift time and easy stopping qualities." It is advisable to make faster time than is possible with mules, and it is not hard to find a locomotive that will run faster and stop and start quicker than a mule, but the high cost of coal, $30 to $35 per ton, compelled the company to give up the use of steam after demonstrating its convenience to those using the lines. Now coal can be procured at $15 per ton and locomotives will be again employed. The engines are to be built by the Baldwin Works.

Interlocking.

The Lehigh Valley is about to put in several interlocking machines. It is said that three plants have been decided upon aggregating 34 levers, and work has been begun on the foundations for one of them. Several distant signals for crossings and junctions will shortly be erected.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Albany, quarterly, 2 per cent., payable Dec. 31.
Cincinnati, Indianapolis, St. Louis & Chicago, quarterly 1¼ per cent., payable Dec. 15.
Connecticut River, quarterly, 2 per cent., payable Jan. 1.
Cornwall & Lebanon, semi-annual, 3 per cent.
Eastern (New Hampshire), 2½ per cent., payable Dec. 15.
Lowell & Andover, 3½ per cent, payable Dec. 6.
Old Colony, 3½ per cent. payable Jan 1.
Philadelphia, Wilmington & Baltimore, semi-annual, 4 per cent., payable n January.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston & Albany, annual meeting, 78 Tremont street, Boston, Mass., Dec. 12.
Boston & Maine, annual meeting, Lawrence, Mass., Dec. 12.
Cleveland & Pittsburgh, annual meeting in the office of the company in Cleveland, O., Jan. 2, 1889.
Connecticut River, annual meeting, Springfield, Mass., Dec. 18.
Eastern, annual meeting, Causeway street, Boston, Mass., Dec. 12.
East Tennessee, Virginia & Georgia, special meeting, Knoxville, Tenn., Dec. 22, to consider the approval of the lease to the Richmond & Danville.
Fort Worth & Denver City, annual meeting, Fort Worth, Tex., Dec. 11.
Knoxville & Ohio, annual meeting, Knoxville, Tenn., Jan. 21 to consider the question of approving the lease of the Knoxville & Ohio to the East Tennessee, Virginia & Georgia, heretofore made in accordance with resolutions adopted by the board of directors.
New York, Providence & Boston, annual meeting, Butler Exchange Building, Providence, R. I., Dec. 12.
New York & New England, annual meeting, Boston, Mass., Dec. 11.
Norwood & Montreal, annual meeting, 96 Broadway, New York, Dec. 28
Richmond & West Point Terminal Railway & Warehouse Co., annual meeting, Richmond, Va., Dec. 11.
Rome, Watertown & Ogdensburg, annual meeting, 96 Broadway, New York, Dec. 28
Rome, Watertown & Ogdensburg Terminal, annual meeting, 96 Broadway, New York, Dec. 28.
Syracuse, Phœnix & Oswego, annual meeting, 96 Broadway, New York, Dec. 28.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Association of Railway Chemists* will hold its next meeting in Baltimore, Md., Jan. 14, 15 and 16.
The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.
The *Western Railway Club* meets the third Tuesday in each month in the Phenix Building, Chicago.
The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.
The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.
The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street New York.
The *Boston Society of Civil Engineers* holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday in each month.
The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.
The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.
The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Gerard street, Philadelphia.
The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at Pittsburgh, Pa.
The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.
The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.
The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m. on the third Saturday in each month.

The Western Society of Engineers.

The 252d meeting was held Nov. 14. Mr. Lewis Passmore Pennypacker was elected a member.

The Secretary read a letter from Prof. Allan D. Conover, University of Wisconsin, stating that a comprehensive system of tests of all the cements used in this country had been undertaken and requesting information as to makers of cements and experience of members. After brief discussion, the Secretary was directed to communicate with Prof. Conover.

Mr. Liljencrantz, from Committee on Employment, reported that the matter had not been disposed of, and it was made a special order for next meeting.

Mr. Strobel, from Committee on Bridges, made an extended progress report and the question of legislation was discussed for the views of members. The correspondence with other societies showed a wide and active interest. The Committee will report formally with the draft of a bill at a future meeting.

As legislation of kindred interest to engineers, the Secretary presented the desirability of expanding the duties of the State Board of Health so as to require its approval of all plans for waterworks and sewerage. From a conversation with one of the members of the board it was inferred that if the engineers of the state would unite in pushing the matter, they would have the co-operation of the board. No action was taken upon the suggestion.

An interesting paper, entitled "The Necessity of a Definite and Determinate System of Weights and Measures," by Mr. Chas. C. Breed, was presented by the Secretary and after brief discussion ordered printed.

Mr. Weston gave an interesting account of a mammoth electric light plant now under construction in the City of London. A general discussion in regard to the application of any motor to direct propulsion on street railways then ensued. There was some doubt of securing adequate adhesion under all the conditions of track obtaining in crowded cities.

Montana Society of Civil Engineers.

An adjourned meeting was held Nov. 24. Mr. F. J. Smith was elected a member of the society. The committee appointed at the meeting of Oct. 20 to consider and report upon the overheard crossing for the motor line at Main street and Sixth avenue in Helena submitted a report. They recommended an elevated track, and gave details of the location and construction recommended, which were discussed at some length, the principal discussion being as to whether the elevated road should be placed over the sidewalk or over the middle of the street. A vote as to the final adoption of the report was postponed until the next regular meeting.

A communication was read from Prof. A. D. Cowan, of the University of Wisconsin, requesting information upon the brands of cement manufactured, and used in and about Helena. Members of the society were requested to notify the secretary if they knew of any manufacturer of cement in that part of the country and the brand used.

Master Car Builders' Association.

CIRCULAR ON THE MARKING OF CARS.

The Executive Committee, through Secretary M. N. Forney, 45 Broadway, New York City, calls attention, at the request of the Car Accountants' Association, to the violation by some roads of the rules in regard to the proper marking of freight cars, and reprints the standard of the Association as below:

Marking Cars.—A resolution was adopted at the Sixteenth Annual Convention (*see page 158 of Report*), requesting all railroad companies whose initials are the same as those of other railroad companies to stencil the name of the road in full on some part of the car where it can readily be seen by freight agents.

System of Lettering and Numbering Fast Freight Line Cars.—At the eighteenth annual convention, held in Saratoga (*see page 96 of the Report of that meeting*), the following resolutions describing a proposed system of lettering and numbering "Fast Freight Line" cars were adopted:

1st. The half of sides of car on which the doors do not slide, to show the name of the "Fast Freight Line" (spelled out in full) and the car number (in the Fast Freight line series) immediately below it. In the same panel and within 2 ft. of the sill shall appear (in letters not over 4 in. high) the name of the railroad company owning or contributing the car, and between the same and the sill shall appear the light weight of the car with such other information as it is found advisable to give in connection with same.

2d. The doors should have no marks whatever.

3d. The ends to show the initials of the "Fast Freight Line" with the car number (in the Fast Freight Line series) and the light weight just below them; no other marks will appear on ends of car.

4th. The half sides of cars on which the doors do slide, to be reserved for advertising symbols or trade-marks where used. The use of profuse lettering in this panel is to be discouraged, however, and it is recommended that only the simplest trade-marks or advertising signs should be used; the capacity of the car to appear near the sill in this same panel.

The Engineers' Club.

The Engineers' Club was organized at the rooms of the American Society of Civil Engineers Dec. 4. The club starts with a membership of about 200, and intends to select a club-house immediately. The officers are: President, James A. Burden, of the Burden Iron Works, Troy, N. Y.; Vice-Presidents, Henry R. Towne, of the Yale & Towne Manufacturing Co., Stamford, Conn., and James C. Bayles, President of the Spiral Weld Tube Co.; Treasurer, A. C. Rand, of the Rand Rock Drill Co.; Secretary, David Williams, publisher of the *Iron Age*.

PERSONAL.

—D. D. Arden, the Master Mechanic of the Central of Georgia, has retired after a continuous service of 36 years.

—Mr. Peter Hamilton, who during the war was President and General Manager of the Mobile & Ohio, died recently in Mobile, Ala., aged 77 years.

—Governor Dillingham, of Vermont, has appointed Dr. W. Seward Webb, President of the Wagner Palace Car Co., Inspector of Rifle Practice, with the rank of Colonel.

—J. Van Vechter, who has been Master Mechanic of the Delaware Division of the New York, Lake Erie & Western, has resigned on account of ill health, and has been succeeded by Wm. Ransom.

—Col. C. O. Wood, for some time past General Passenger Agent of the Cleveland, Akron & Columbus, has tendered his resignation, to take effect Dec. 1. He will be succeeded by H. B. Dunham, the present General Freight Agent of that road.

— E. S. Bowen has been appointed Acting General Manager of the Rome, Watertown & Ogdensburg in place of General Manager H. M. Britton, who is on a trip to Europe for his health. Mr. Bowen was formerly Vice-President of the New York, Lake Erie & Western.

—Mr. O. R. Whitney, formerly of the Lake Shore & Michigan Southern and West Shore roads, and late Superintendent of the New York & Sea Beach road, has been appointed Superintendent of Motive Power of the Alabama Midland, with headquarters at Montgomery, Ala.

—Mr. Alfred Morrison, who for some years has been Roadmaster of the western division of the Pittsburgh, Fort Wayne & Chicago, has retired from that position to engage in business in Chicago, and the employés on the line last week presented him with an elegant gold watch and chain.

—Norman Beckley, General Manager of the Cincinnati, Wabash & Michigan, contemplates retiring, on account of poor health. He has held his present position for ten years, coming off the Lake Shore & Michigan Southern, on which he was for many years a division superintendent. He entered railway service in 1845, on the Vermont Central.

—R. M. Richardson, Master Mechanic of the St. Louis, Iron Mountain & Southern, has resigned, and has been succeeded by Frank Reardon, of Denison, Tex., who has been with the Missouri, Kansas & Texas for several years as Master Mechanic. Mr. Richardson has been in the service of the St. Louis, Iron Mountain & Southern since 1866. The position he now resigns he has held for 14 years. It is reported that after a vacation he will accept another position on the system.

—At Rochester, N. Y., last week the employés of the Buffalo, Rochester & Pittsburgh presented George A. Merchant, late General Manager, with an elegant clock and a purse of $1,200 invested in a building and loan association. The clock was imported from England, and upon the front side of the case is a silver plate bearing the inscription: "Presented to George A. Merchant by the employés and friends of the Buffalo, Rochester & Pittsburgh Railway, Nov. 25, 1888."

—Col. George A. Merrill died at St. Paul, Minn., Nov. 24. He was born at Plymouth, N. H., in 1820, and moved to St. Johnsbury, Vt., where he was for a time Superintendent of the Passumpsic road. He moved to Rutland in 1864, and was appointed Superintendent of the Rutland & Burlington, which position he held until 1871, when the Central Vermont took possession of the road. He then became Superintendent of the New London Northern, and after two years is appointed Superintendent of the Passumpsic. In 1876 he took charge of the Howe Scale Co. at Rutland and managed its affairs for five years. He has been in ill health for several years.

—Henry R. Low, formerly President of the Port Jervis, Monticello & New York, and a well-known railroad contractor, died in New York City Dec. 1. He was largely interested in the New York & Oswego Midland, now the New York, Ontario & Western. His latest contract was for the extension of the Port Jervis, Monticello & New York to Summitville. Mr. Low was a well-known Republican politician in New York State, and has several times served terms in the state Senate, and was a member at the time of his death. Mr. Low had five children, and one of his daughters was married to Charles Clark, Superintendent of the Port Jervis, Monticello & New York, and another to J. C. Anderson, General Superintendent of the New York, Ontario & Western.

ELECTIONS AND APPOINTMENTS.

Alabama Belt.—The incorporators are A. L. Tyler, T. Parker, James W. Lapsley, H. Staughton, E. T. Witherby, J. B. Goodwin, and S. E. Noble. The offices are at Blocton, Ala.

Alabama Midland.—O. R. Whitney has been appointed Superintendent of Motive Power with office at Montgomery, Ala.

Bell's Gap.—Frank S. Lewis has been elected Treasurer of the company, vice J. G. Cassatt, resigned; E. M. Steck has been appointed Auditor, with office at Bellwood, Pa. The general office of the company has been removed from South Third street to the Bullitt Building, Philadelphia, Pa.

Buffalo, Rochester & Pittsburgh.—Thomas F. Wentworth, Secretary, and F. R. Brown, Treasurer, have resigned, and Mr. McDonald has been appointed to both positions.

Central of Georgia.—H. G. Hargroves, of Atlanta, has been appointed General Agent at Kansas City, Mo.

Chautauqua Lake.—The following officers were elected at the recent annual meeting: Hon. J. M. Gazzam, President, Philadelphia, Pa.; John Cadwell, Vice-President, Jamestown, N. Y.; Geo. H. Burt, Treasurer, Boston, Mass.; D. H. Post, Secretary, Jamestown, N. Y.; F. G. Jewett, Superintendent, Jamestown, N. Y.; F. Bristow, Auditor and Assistant Treasurer, Jamestown, N. Y.

Chesapeake & Ohio.—W. H. Harlin has been appointed Superintendent of Telegraph and Chief Train Dispatcher of the Lexington Division.

Chicago, Burlington & Quincy.—The following appointments are announced: L. E. Johnson, Superintendent of the Chicago Division, vice George Alexander, assigned to other duties. E. M. Herr, Superintendent of the St. Louis Division, vice L. E. Johnson, transferred. W. W. Nichols, Superintendent of Telegraph, vice E. M. Herr, promoted.

Chicago & Northwestern.—A circular has been issued giving the official announcement of the appointment of E. A. Holbrook as General Traffic Agent, with headquarters at San Francisco, Cal. Mr. Holbrook will have charge of all freight and passenger agencies of the company in the states of Oregon and California.

Decatur, Chesapeake & New Orleans.—The incorporators of the company in Alabama are: A. F. Murray, J. T. Crass, J. S. Reid, H. M. Metz, J. R. Boyd, S. H. Gruber and L. M. Fulk. The general offices are at Decatur, Ala.

East Tennessee, Virginia & Georgia.—M. D. Decker has been appointed Chief Train Dispatcher, with headquarters at Macon, Ga.

Georgia Pacific.—The following Board of Directors were re-elected for the ensuing year at the annual meeting held in Birmingham Nov. 28: John W. Johnston, of Birmingham, Ala.; Joseph Bryan, of Richmond, Va.; George S. Scott, John H. Inman, Calvin S. Brice, John A. Rutherford, John G. Moore, J. C. Maben and George F. Stone, of New York.

Idaho Central.—The following changes in the management are announced, taking effect Nov. 10: E. S. Van Kuran, Superintendent, succeeding J. Hunter, resigned; Edgar M. Heigho, Car Accountant, to succeed R. C. Oglebay, resigned.

Indiana Midland.—The general offices of the company, which were removed from Anderson to Lebanon, Ind., a few months ago, have been moved back to Anderson.

Kansas City, Fort Scott & Memphis.—The following circular has been issued: E. J. Perry having been assigned to other duties, H. S. Mitchell has been appointed Division Superintendent of the Kansas City, Springfield, Joplin and Cherryvale divisions, and the Kansas City, Clinton & Springfield Railroad, with headquarters at Fort Scott, Kan.

Lehigh & Hudson River.—The stockholders of the road met in New York Dec. 3 and elected the following officers: Grinnell Burt, President; J. S. Harris, Vice-President; D. B. Halstead, Secretary; John Sayre, Treasurer, and N. L. Furman, Superintendent. The directors are: J. S. Harris, F. C. Yarnall, E. W. Clark, E. Lewis, G. Burt, J. S. Martin, W. C. Sheldon, G. W. Sanford, J. R. Maxwell, Austin Corbin, G. F. Baker, E. D. Adams and G. A. Hobart.

Lehigh Valley.—Charles P. Coleman has been appointed Chemist of this company, with office at South Bethlehem, Pa. On and after Dec. 1, all lubricating and illuminating oils, tallow and waste used by this company will be furnished upon requisition of the master car-builder, the master machinists or other authorized persons, on the chemist of the company.

Louisville & Nashville.—E. H. Mann has been appointed Assistant Superintendent of the Elkton & Guthrie road, and of the Henderson & St. Louis Division of the Louisville & Nashville, vice W. M. Newbold, transferred.

Louisville, St. Louis & Texas.—The general offices of this road, which has just been opened, are at Louisville, and the following officers have been appointed: John H. Sample, Chief Engineer; J. K. McCracken, General Passenger and Freight Agent; A. M. McCracken, Acting Superintendent; F. J. Ferry, Master Mechanic; M. H. Fulton, Train Dispatcher; E. B. Hitchcock, Roadmaster between Stephensport and Owensboro; H. M. McCracken, Roadmaster be

tween Stephensport and West Point. The Superintendent's office will be located at Owensboro, Ky., for the present.

Mississippi & Tennessee.—At the annual meeting held in Memphis last week, the following Board of Directors was elected: Stuyvesant Fish, E. H. Harriman, John Authon, H. F. Webster, Walter Luttgen, S. V. R. Cruger, all of the Illinois Central Co.; N. R. Sledge, of Como, Miss.; and C. F. Vance and M. Burke, of Memphis.

Missouri, Kansas & Texas.—C. H. Dent, Superintendent of Car Service, has resigned to accept service elsewhere. M. Sweeney has been appointed to fill the vacancy, with the title changed to Superintendent of Transportation.

Missouri Pacific.—B. D. Caldwell has been appointed Assistant General Passenger and Ticket Agent, with office in St. Louis.

Mobile & Ohio.—Richard V. Taylor has been appointed General Auditor to fill the vacancy caused by the death of George Layet.

Newport News & Mississippi Valley.—M. B. Leonard having severed his connection with this company, W. H. Hartman has been appointed Superintendent of Telegraph, in addition to his duties as Chief Dispatcher, with office at Lexington, Ky.

New York Central & Hudson River.—W. D. Otis, General Roadmaster, has appointed J. B. Bennett Roadmaster of division No 14, including the Auburn, Geneva and Lyons branches from Rochester; M. K. Winfield of No. 11, main line, Lyons to Rochester, and Frank B. Curtis, formerly civil engineer in General Roadmaster's office, to No. 6, at Albany.

New York, Lake Erie & Western.—T. W. Ransom has been appointed Master Mechanic of the Delaware Division, in place of J. Van Vechten, resigned.

New York, New Haven & Hartford.—The following appointments have been made: S. C. Fleetwood, Auditor of Disbursements; F. B. Bertine, Auditor of Passenger Receipts; J. Mackrille, Auditor of Freight Receipts, office at New Haven, Conn.

Northern Pacific.—The Board of Directors have appointed Charles A. Clark (now Cashier) Assistant Treasurer of this company, with office at St. Paul, Minn., and the office of Cashier has been discontinued.

Old Colony.—The following are the names of the directors re-elected at the annual meeting in Boston, Nov. 27: C. F. Choate, of Southborough; F. L. Ames, of Easton; T. J. Borden and J. S. Brayton, of Fall River; S. C. Cobb, G. A. Gardner, J. R. Kendrick, Boston; Thomas Dunn, Newport; C. L. Lovering, Taunton; W. J. Rotch, New Bedford; J. J. Russell, Plymouth; Nathaniel Thayer, Lancaster; R. W. Turner, Randolph. At a subsequent meeting of the directors the present officers of the company were re-elected.

Oxford & Henderson.—The general officers of the Richmond & Danville, in their respective departments, have assumed charge of the business of this road and the Oxford & Clarksville under the lease to the Richmond & Danville.

Pennsylvania.—Amos R. Little has been chosen as a director to fill the vacancy in the board caused by the death of John Price Wetherill.

John Whittaker has been appointed Assistant General Freight Agent, an office just created.

Pittsburgh & Connellsville.—The stockholders of the company held the annual meeting in Pittsburgh Dec. 3, and elected the following officers: President, Orlando Smith, of Cincinnati, vice Samuel Spencer, resigned; Secretary and Auditor, J. B. Washington, of Pittsburgh. The following directors were also chosen: Orlando Smith, of Cincinnati; John W. Chalfant, of Allegheny, Pa.; Robert Garrett, Mendes Cohen, Charles Webb and Findley H. Burns, of Baltimore; W. H. Koontz, Somerset, Pa.; John D. Scully, C. L. Fitzhugh, Wm. Metcalf and Wm. J. Moorhead, of Pittsburgh.

Richmond & Alleghany.—C. T. Dabney has been appointed Superintendent of Transportation; vice A. D. Bethard, resigned to accept service with another road; M. B. Leonard, Superintendent of Telegraph of the Chesapeake & Ohio, has been appointed Superintendent of Telegraph of this road.

Oscar G. Murray has been appointed Freight Traffic Manager of this road, in addition to his duties as Freight Traffic Manager of the Chesapeake & Ohio and the Cincinnati, Indianapolis, St. Louis & Chicago..

Richmond & Danville.—The annual meeting of the stockholders of the company was held at Richmond, Va., Dec. 5. The following officers were elected: President, George S. Scott; Board of Directors, John H. Inman, Samuel Thomas, Calvin S. Brice, John G. Moore, Harris C. Fahnestock, George F. Stone, John H. Paul, John A. Rutherford, Charles M. McGee, John S. Barbour, J. C. Mahen and Samuel I. Ingram.

Rome, Watertown & Ogdensburg.—E. S. Bowen has been appointed Acting General Manager, with office at Oswego, N. Y. Edwin Parsons has been appointed Purchasing Agent and Assistant to the General Manager, with headquarters at Oswego, N. Y. The appointment of Frank W. Parsons, Assistant General Freight Agent, as General Freight Agent is also announced.

St. Louis, Arkansas & Texas.—J. K. Waterman has been appointed Assistant General Freight Agent of the company, with headquarters in Fort Worth, Tex.

St. Louis, Iron Mountain & Southern.—Frank Reardon has been appointed Master Mechanic, with office at Baring Cross, Ark., vice R. M. Richardson, resigned.

St. Louis, Quincy, Omaha & Sioux City.—The board of directors of this new Iowa company are: F. R. Stearns, of New York City; T. A. Scott, J. W. Harrison, J. C. Richardson, J. R. Holmes and Josiah Fogg, of St. Louis, Mo.; J. M. Bishop, of Quincy, Ill., and J. E. Booge and James F. Peavey, of Sioux City.

The company has elected directors as follows: T. A. Scott, J. W. Harrison, J. C. Richardson, J. R. Holmes and Josiah Fogg, St. Louis; J. M. Bishop, Quincy, Ill.; J. E. Booge, F. B. Stearns and James F. Peavey, Sioux City; H. K. Thurber, George M. Hard, A. B. Cleveland and Theodore Weed, of New York. F. B. Stearns was elected President; J. Cliff Richardson, of St. Louis, Vice-President, and Theodore Weed, of New York, Secretary and Treasurer.

San Domingo Central.—At the annual meeting of the company held in New York this week the following directors were elected: Horatio C. King, Henry L. Bean, W. H. Libby, Philip P. Harris, George G. Ward, Henry W. Alden, James E. Coleman, C. C. Munroe and Milton Griswold. At the directors' meeting Gen. Horatio C. King was re-elected President; Henry L. Bean, First Vice-President; George G. Ward, Second Vice-President; James E. Coleman, Secretary, and Philip P. Harris, Treasurer.

Seattle & Northern.—Following are the names of the incorporators: Elijah Smith, of New York, and W. H. Holcomb, of Portland, Or., President and General Manager respectively, of the Oregon Railway & Navigation Co.; James H. Benedict, Charles F. Tagg, John S. Tilney, Prosper W. Smith, E. L. Frank and E. S. Hooley, of New York; T. J. Milner and J. C. Haines, of Seattle, Wash. Ter.; and H. L. Tibballs, Jr., of Port Townsend. The trustees for the first year are: T. J. Milner, H. L. Tibballs, G. H. Baker, J. P. Hoyt, Elijah Smith, John T. Tilney and J. H. Benedict, and the principal office is at Seattle.

Southern Pacific.—John Reynolds, formerly Assistant Supervisor of the Western Division of the Little Miami between Cincinnati and Xenia, has been appointed Supervisor of the Houston & San Antonio (Tex.) division of the road.

The company has created a new division from Houston, Tex., to Lafayette, La. The line of the road has been redivided, making a division from El Paso to San Antonio, another from San Antonio to Houston, and another from Houston to Lafayette. Formerly, Glidden was a dividing point.

Stanstead, Shefford & Chambly.—At the recent annual meeting of the shareholders of the company at Waterloo, P. Que., the following directors were elected: Hon. G. G. Stevens, Hon. J. Gregory Smith, Hon. Guy C. Noble, H. L. Robinson, J. W. Hobart, E. C. Smith, J. G. Cowie, A. H. Moore and George T. Childs.

Toledo, Indianapolis & St. Louis.—The incorporators of this company are: A. Dale-Owen, W. G. Ross, and the S. M. Company, of Orville, Ohio; J. C. Spray and Louis H. Ayme, of Dunning, Ill.: S. S. Burt, of Chicago; Jonathan Owen, of Onarga, Ill.; W. A. Tillotson and Irvin Palmera, of Detroit; Samuel J. Spray, of Salida, Col.; Samuel Owen, of Westfield, Ind., and J. D. Sherman, of Paupau, Mich.

Ulster & Delaware.—The annual meeting of the company was held at Rondout, N. Y., Dec. 4. The following directors were elected: Thomas Cornell, A. S. Staples, H. C. Soop, R. G. Townsend, A. Benson, E. McNeil, T. C. Hornbeck, Charles Bray, Davis Winne, R. B. Jones and R. B. Carpenter.

Union Pacific.—G. M. Cumming, General Manager of the St. Joseph & Grand Island, has been appointed Superintendent of the Wyoming Division of this road, with office at Cheyenne, Wyo., vice C. E. Murtell, resigned.

White & Black River Valley.—At a meeting held at Newport, Ark., Dec. 2, the following officers were elected: Hon. James P. Coffin, President; W. L. McDonald, Secretary and Treasurer, and Hon. M. F. Collier, Attorney. The directors are: R. W. Martin and W. J. Thompson, of Little Rock; E. G. Thompson, of Augusta; James P. Coffin, of Powhatan; M. F. Collier, of Pocahontas; Col. James T. Henderson, of Auvergne, and W. L. McDonald, of Newport.

Williamsville, Greenville & Northern.—The following are the officers of this Missouri company: H. N. Halladay, President; A. B. Martindale, Treasurer; C. W. White, Secretary; A. L. Bowen, General Superintendent and Chief Engineer. The general office is in Williamsville, Mo.

OLD AND NEW ROADS.

Alabama.—Bills have been introduced in the legislature to charter the following railroad companies: Gulf & Chicago, Centresville, Fort Payne & Chattanooga Valley, Montgomery & Sylacauga, capital stock, $1,000,000, to build a road from Montgomery to Sylacauga, with B. K. Collier, of Montgomery, and others as corporators; Birmingham, Talladega & Eastern, Nacoochee Valley and the Atlantic & Birmingham.

Alabama Belt.—Declarations of incorporation have been recorded at Montgomery, Ala., for the building of a road of this name. The road is to run from Attalla, via Gadsden, Amiston, Syllacauga, Shelly, Calera, Brierfield and Blocton, to Woodstock, on the Alabama Great Southern. The company is organized with a capital of $3,000,000.

Atlantic, Greenville & Western.—This company was organized to build a road between Augusta, Ga., and Greenville, S. C. Much of the grading on the line was completed, when it was consolidated last year with the Carolina, Knoxville & Western, which is building a road from Greenville to Knoxville, Tenn. It is now stated that some of the stockholders will try to have the consolidation set aside and affect another consolidation with the Charleston, Cincinnati & Chicago, giving that company a line to Augusta.

Atlantic & Pacific.—The company is recording in the counties in New Mexico through which it runs copies of two mortgages made by the Atlantic & Pacific Co. in favor of the Mercantile Trust Co., of New York. The first mortgage was for $20,000,000, and the second for $5,700,000. Of the latter sum $1,000,000 was for the road from Albuquerque, N. M., to Isleta.

The company has a large force of men at the Colorado River at work on the changes in the grade of the road, required by the new steel bridge across the river at the Needles. It is eight miles below the present crossing, and 15 miles of new track will have to be laid.

Augusta & Chattanooga.—The financial arrangements of the company for completing the road are said to be good, and preparations for building are being made. Contracts for construction will be let at once. The survey for the road has been made and the profiles completed. The location is complete for the first 130 miles from Augusta through Gainesville, to Chattanooga. Twenty miles have been graded. C. A. Evans, of Augusta, Ga., is President.

Billings, Hot Springs & Gulf.—A company will soon be incorporated under this name to construct a road to extend southward from Billings, Mont., to Hot Springs, Ark., and thence to the Gulf. The general offices will be located at Billings, and the financial office, under the management of L. Wesley Frost, at No. 146 Broadway, New York city. The length of the contemplated line is to be about 600 miles; its breadth and thickness are not stated.

Binghamton & Williamsport.—Ground was broken this week at little Meadows, Pa., for the construction of this road, which is to be built between Binghamton, N. Y., and Williamsport, Pa.

Burlington & Missouri Valley.—The company has commenced work on a new line from Alliance, Neb., northwest, crossing the Fremont, Elkhorn & Missouri Valley road at Crawford. About 1,000 men are reported at work, scattered all along the route.

Cairo & Tennessee.—Marshall County, Ky., last week, voted to subscribe $45,000 toward the capital of this road, to secure it within the county's bounds.

Canada & St. Louis.—The road is now nearly all completed between Bay City, Mich., and Goshen, Ind., 65 miles. The projectors of the enterprise propose to push work on the extension southwest to Danville, Ill.

Canadian Roads.—By-laws granting bonuses of $70,000 to the Napanee & Tamworth, and of $150,000 to the Kingston & Smith's Falls road, were voted on at Kingston, Ont., Nov. 29, and both were carried.

The bonus by-law granting $40,000 to the Canadian Pacific to run its branch from London through Chatham, Ont., was voted on at Chatham and carried.

Cape Girardeau Southwestern.—The extension from Wappapello through Chaonia to Williamsville, Mo., on the St. Louis, Iron Mountain & Southern, a distance of about 20 miles, was completed on Dec. 1. Regular trains to Williamsville will be put on this week. The extension from Williamsville to Hunter on the Current River road is being rapidly graded, and the company expects to have trains running there by Feb. 1.

Carolina, Knoxville & Western.—Tracklaying on this road has now been completed to within a few miles of Brevard, N. C., and the grading is finished to Marietta, S. C., a few miles north of Greenville.

Central of Georgia.—Prior to the acquisition of the company's stock by the Richmond & West Point Terminal Co., H. B. Hollins & Co., as financial agents of the road, agreed to sell to Drexel, Morgan & Co., $5,000,000 of the new issue of five per cent. bonds out of a total issue of $10,000 000. The price to be paid is believed to have been 97½. At the same time they gave Drexel, Morgan & Co. an option on the remaining $5,000,000. Before the completion of the arrangement the Richmond Terminal Co. purchased the company's stock. Drexel, Morgan & Co. have now notified the Richmond Terminal Co. that they do not propose either to take any of the bonds or to exercise their option. As a result of this action the contract for the new ocean steamer has been cancelled, and work on the proposed line betwen Eden and Americus, Ga., will be suspended.

Central of New Jersey.—It is reported that a survey has just been completed in the interest of this company for a new outlet from Point Pleasant to Philadelphia via Lakewood, N. J. The design is for the new line to connect with the New Jersey Southern.

Chicago, St. Louis & Paducah.—The road was opened for business Dec. 3, regular trains being run between St. Louis and Paducah, Ky. A car transfer has been established between Brooklyn, Ill., and Paducah, and passenger trains will run to and from the new Union Depot at Paducah. The officers of the Cairo Short Line will have charge of the entire line, and the new road will be known as the Paducah division of that road.

Chicago, Santa Fe & California.—The company has filed with the Secretary of State of Illinois a certificate reducing the capital stock from $30,000,000 to $15,000,000. A similar certificate has been filed reducing the stock of the terminal company, the *Atchison, Topeka & Santa Fe, in Chicago*, from $10,000,000 to $5,000,000.

Columbia & Puget Sound.—At an adjourned meeting of the stockholders held in Seattle, W. T., Nov. 28, the proposition to increase the capital stock from $575,000 to $1,000,000 was unanimously adopted. The object of the increase is to provide for the payment of the floating debt incurred in making improvements.

Cincinnati, Hocking Valley & Huntington.—The Circuit Court at Hilisboro, O., orders that the road be sold in six weeks, at the Courthouse in Cincinnati. It is to be sold in two sections, viz.: the five miles east of Adelphi, for not less than $10,000, and the balance, including the finished and partly finished part west of Fayetteville, which shall sell for not less than $80,000. The liens on the road amount to $60,000. The road extends from Cincinnati, through Fayetteville and Hillsboro, to a connection with the Eastern division, owned and operated by John Karshner. Eleven miles between Milford and Fayetteville are completed, ready for trains, and 11 more to Fayetteville are graded and bridged and the ties bought. Five miles of road east of Adelphi, in Ross County, is graded ready for ties. Between that point and Fayetteville no work has been done, but rights of way on a large portion of the line have been secured. The distance from Hilisboro to Cincinnati by this route is 52 miles.

Cornwall & Lebanon.—Surveyors are still engaged in running lines for the Reading & Lebanon road between Lebanon and Reading, Pa., 30 miles, and it is stated that the line will be placed under contract early in the spring. W. H. Kaufman, of Reading, is President of the Reading & Lebanon.

Coshocton & Southern.—President Blood states that this road, now being built from Coshocton to Zanesville, O., where it will connect with the Baltimore & Ohio, is not being built by the Cleveland & Canton, as has been reported, but simply by parties interested in the Cleveland & Canton. There is no intention of turning it over to the Cleveland & Canton unless the stockholders of the latter desire. By this road the Cleveland & Canton has a connection with the Baltimore & Ohio, which desires a Cleveland outlet. The Zanesville extension will probably be finished by January. The bonds bear five per cent. interest, and were sold at 85.

Dayton & Michigan.—Judge Peck, of the Superior Court of Ohio, on an application by a holder of Dayton & Michigan preferred stock for an injunction preventing the collection of tax by the county officers, has decided that such stock is taxable. The certificates of stock, he says, guarantee regular dividends to holders. This guarantee is secured by mortgage. The holders of this stock do not have the right to vote. The Court, therefore, holds that they are not stockholders, but creditors of the road, and refuses the injunction.

Dayton & Toledo.—The work of widening the road to standard gauge has been completed. An extension will, it is reported, be built from Celina to Fort Wayne, Ind., by way of Weltshire. The road at present extends from Delphos, O., to Dayton, 95 miles.

Duluth, Red Wing & Southern.—Grading is now nearly finished on the line of the road between Red Wing and Zumbrota, Minn. Tracklaying is progressing very rapidly, and about 15 miles have already been laid. In another week the track will probably be laid to Zumbrota.

Duluth & Winnipeg.—A dispatch from Minneapolis says that the first rails on the road were laid Dec. 4, at Cloquet, Minn., a large number of people witnessing the ceremonies.

East Tennessee, Virginia & Georgia.—The company has issued a circular announcing that, in accordance with the decision of the Chancellor of the Knox County Chancery Court, and by order of the Board of Directors of the company, the road will be operated from and after this date by the officers and agents appointed by the board. C. H. Hudson has been appointed General Manager, with headquarters at Knoxville, Tenn., to whom all officers and agents of the company will report.

Evansville & Richmond.—The merchants and manufacturers of Columbus, Ind., have offered D. J. Macky $75,000 cash to build this road, by that city, and the matter is being considered.

Florida Railway & Navigation Co.—The company is said to contemplate building an extension from Monticello, Tallahassee or Quincy, Fla., either to Columbus, Ga., or to Montgomery, Ala., giving direct connection with the West.

Fort Worth & Rio Grande.—An amended charter of the company has been filed in Texas and indicates the line to be from Fort Worth southwesterly to a connection with the San Antonio & Aransas Pass at Kerrville, through the counties of Tarrant, Parker, Johnston, Hood, Erath, Comanche, Brown, San Saba, McCulloch, Mason, Llano, Gillespie and Kerr, a distance of 330 miles, and a short branch to connect near Fort Worth with the Gulf, Colorado & Santa Fe. The capital stock is increased to $3,500,000, and bonds are to be issued, not exceeding $20,000 per mile, to take up outstanding bonds amounting to $600,000.

Georgia Pacific.—At the annual meeting held in Birmingham, Ala., Nov. 28, the lease of the property of the company to the Richmond & Danville (heretofore approved by the Board of Directors of the two companies) was unanimously approved by the stockholders. The stockholders of the Georgia Pacific have also approved the lease.

Grafton & Upton.—The company has applied to the Railroad Commissioners for a certificate of exigency for an extension of the road from West Upton to Millford, Mass.

Grand Island & Wyoming Central.—This company, part of the Burlington system, has filed a certificate in Nebraska, increasing the capital stock to 15,000,000. This is supposed to be to permit the construction of 200 miles of new road in Wyoming.

Grand Southern.—The balance of the purchase money, $76,000, for the road, running between St. John, N. B., and St. Stephen, has been deposited in the Bank of New Brunswick. A company, composed of Russell Sage, Giles E. Taintor, Horace M. Ruggles and Richard Cross, of New York, and John McMillan and Hugh H. McLean, of St. John, will apply to the Legislature for letters patent incorporating the Shore Line Railroad, a reorganization of this road. The capital is $500,000.

Gulf & Ship Island.—About 70 miles of this road have been graded, 22 miles of track laid, and cross ties distributed for 20 miles more. The 200 state convicts, which the company has been working on the road, have been returned to the state and the lease cancelled. W. H. Hardy, the President of the road, states that this will not interfere with the construction of the road.

High Point, Randleman, Asheboro & Southern.—Colonel Andrews, Third Vice-President of the Richmond & Danville, held a consultation with the officers of the road at High Point, N. C., last week, and it is understood that arrangements were made for building the road from High Point to Asheboro, N. C.

Hudson, Suspension Bridge & New England.—The company has concluded the purchase of property at Fort Clinton, N. Y., for which negotiations have been long pending, and the Bridge Co. has acquired the necessary land for terminal facilities at the western end of the bridge.

Indianapolis, Decatur & Western.—The company has definitely determined upon extending the line from Decatur to Beardstown, Ill., 80 miles west of Decatur, and the Chicago, Burlington & Quincy has agreed to extend its line east from Quincy so as to connect with the new line. The work will begin early in the Spring. This company is also contemplating extending the line from Beardstown to Keokuk, Ia.

Kansas City, El Paso & Mexican.—The first ten miles of the road from El Paso, Tex., have been opened for passenger traffic.

Kansas City & Pacific.—Tracklaying on the road from Vance northeast 32 miles to Paola, Kan., will be completed about Dec. 15. A right of way was granted the company last summer through the Indian Territory, and early next year the road will commence work in the territory.

Kansas City, Wyandotte & Northwestern.—The company has virtually completed negotiations with the St. Joseph & Grand Island road, by which the company will use the latter road from Seneca to Axtell, Kan., 11 miles, in the extension to Summerfield.

Lancaster & Hamden.—The contract for the completion of the road has been let to E. P. Buell & Co., of New York. Work will be begun as soon as possible. The road is to extend from Lancaster to Tarlton, O., 18 miles.

Lebanon Springs.—The road, which extends from Bennington, Vt., to Chatham, N. Y., 57 miles, will be again sold on Dec. 11, by the sheriff at Troy, N. Y.

Lehigh Valley.—The new cut-off between Pittston and Fairview, Pa., 17 miles long, has just been completed. By this line the heavy grades over the old route via Wilkesbarre are avoided.

Louisana, Arkansas & Missouri.—It is thought that the contract for building this road will be let in the spring at the latest, and possibly this winter. The road is to extend from Brinkley, Ark., to Alexandria, La., and of this 30 miles have been located, and the preliminary survey completed for 90 miles further. The object of the road is to reclaim and develop the rich alluvial parishes of West Carroll, Morehouse, Onachita, Richland, Franklin, Caldwell, and ports of Catahoula, Tensas and Concordia, in Louisiana, besides the counties of Desha, Chicot and Ashley in Arkansas, by stopping water from running through low country along the west bank of the Bayou Maçon from the North end of Maçon hills to high ground near Hurds Station on the Monticello & Warren branch of the Little Rock & Fort Smith, and giving direct connection for Northeast Louisiana with Memphis, St. Louis and the Northwest at Brinkley, Ark., and with New Orleans over two lines. Logan H. Roberts of Little Rock, Ark., is President, and L. N. Polk, of Delhi, La., is Principal Assistant Engineer.

Louisville & Nashville.—The suit of William S. Williams against the United States Trust Co. to recover $105,000 damages, has been dismissed by Judge O'Brien of the Supreme Court of New York. Williams borrowed $300,000 from the company, giving as collateral security 400 first-mortgage coupon bonds of the Louisville & Nashville Railroad Co., New Orleans & Mobile division. The plaintiff claimed that the company had disposed of the bonds for $105,000 less than their value.

The transcript in the case of the company against the Ohio & Mississippi has been transferred from the Civil Courts at Louisville, Ky., to the United States District Court there.

Louisville, St. Louis & Texas.—This road has been formally opened for freight and passenger traffic between Louisville & Owensboro, Ky., a distance of 112 miles. It is announced that the road will be opened all the way to Henderson, Ky., by Dec. 15 at the latest. The people of Brandenburg, Ky., have asked the company to build a branch line from its main track to the town, a distance of 2½ miles. The citizens agree to grant the right of way, grade the road and furnish the sleepers if the management will do the rest. It is very probable the offer will be accepted.

Marietta, Columbus & Northern.—The contract for the construction of the extension from Amesville Station to Newton on the Toledo & Ohio Central has been awarded to R. Merydeth & Son, of Marietta, O. The route is through the extensive coal fields of Athens, Perry and Hocking counties.

Maysville & Big Sandy.—Although this Kentucky road is now about completed, President Ingalls has decided that it shall not be opened until March 1, consequently the offices of the Chesapeake & Ohio at Louisville, Ky., will not be moved to Cincinnati until that date, and not Jan. 1, as formerly stated. The road will be known as the Maysville division of the Chesapeake & Ohio.

Mexican Mineral.—The company has been organized with a capital stock of £75,000, to construct, in the Republic of Mexico, railways, tramways, mills, canals, etc., and in particular to construct a mineral railroad on the Palmarejo mining property in the canton of Matamoras, near Chinapas, in the state of Chihuahua, Mexico, and to construct waterworks in the same vicinity for the mines.

Mexican National.—Mr. H. Filley, the Chief Engineer of the Mexican National Construction Co., is arranging with Mr. James Sullivan the details for the construction of the line from Manzanillo and Colima to Guadalajara, Mr. Arthur P. Herbert, the locating engineer, having completed his surveys.

A line from Zacatecas to some point on the Mexican National connecting that city with San Luis Potosi is also in contemplation.

Mexican Roads.—Surveys are progressing on the Oaxaca Railroad, which, it will be remembered, is a modification of General Grant's project for a road from the city of Mexico through Oaxaca to the Pacific coast of Mexico, near the western end of the projected Tehuantepec ship railway. It is now in English hands. Messrs. Bowes, Scott, Reed, Campbell & Co., of London, are the promoters and contractors. The line, when completed, will give continuous railroad connection to the Isthmus of Tehuantepec, and will doubtless be extended to join with the Central American railroads.

Missouri, Kansas & Texas.—General Manager M. Sweeney, of the Kanawha & Ohio, has resigned, to accept a position as Superintendent of Transportation of the Missouri, Kansas & Texas.

New Orleans, Natchez & Fort Scott.—The locating survey from Vidalia, La. (opposite Natchez, Miss.), northwesterly to the Tensas River, has been begun. A reconnoissance of the line up the Ouachita Valley via Columbia to Monroe, La., is also being made by Chief Engineer Wingate, and the surveyors will soon follow him.

New Roads.—At a meeting of the citizens of Bellingham Bay at Whatcom recently, Nelson Bennett, the contractor of Tacoma, agreed to build a road from Fairhaven to the Skagit coal and iron mines by Jan. 1, 1890, in consideration of a land subsidy, valued at $100,000, given by the citizens. Half the bonus is to be given when the road is half built, the remainder when completed to the Skagit River. The road will be about 30 miles long, and construction will be commenced early in the spring and the line will be completed in seven or eight months. Surveys have already been made. It is stated that John S. Rockwell, of Angelica, N. Y., has secured right of way for a road from Lincoln Park, a suberb of Rochester, to Charlotte on Genessee Harbor to connect the Buffalo, Rochester & Pittsburgh and the Rome, Watertown & Ogdensburg. It is surmised that the Delaware, Lackawanna & Western will get control of this track, with a view to making Charlotte a shipping point on Lake Ontario for its coal. F. L. Hills, Chief Engineer of the Wilmington & Northern, has made a survey for the Board of Trade, of West Chester, of a proposed road from West Chester to Lenape Station, Pa., on the Wilmington & Northern, a distance of about four miles.

New Westminster, Bellingham Bay & Seattle.—The contract for clearing the right of way and grading the first five miles from Whatcom, W. T., north will be let immediately. The road will cross the Nooksack River at the town of Ferndale and cross the boundary line several miles east of Blaine. As already stated the contract for grading south from New Westminster, B. C., has been let to James Leary.

New York Central & Hudson River.—The rails on that portion of the Athens branch lying between Coxsackie and Athens, N. Y., and which was not used by the West Shore at the time it purchased this branch for a part of its main line, are now being torn up.

New York, Mahoning & Western.—Work has again commenced on this road, and the company's officers succeeded in crossing the Cincinnati, Hamilton & Dayton tracks at Ottawa, O., last week, in spite of the resistance of the employés of the latter road. The road is being built toward Fort Wayne, Ind., and a large force of men is at work on the bridge across the Blanchard River. The road between Findlay and Ottawa, O., completed last summer, is now being ballasted. It is stated that the company has closed an arrangement with eastern bankers, whereby the work of construction has been actively resumed. Negotiations have already begun for the adjustment of all claims that can be settled amicably, and contracts for construction are being made. Richards & Clego have taken a contract to build the road from Tiffin or a point opposite that place to Findlay, and from Ottawa to Fort Wayne, Ind.

New York & Ohio.—The company has let a contract for grading and tracklaying part of the road between Hudson, Summit County, O., and Kinsman, at the Pennsylvania state line. Tracklaying will soon commence at Hudson and continue eastward through Streetsboro to West Farmington, which it is expected to reach by spring. The road will then be completed to Kinsman next summer, and probably extended to Greenville, Pa., by fall.

Omaha, Dodge City & Southern.—The President of the road, is recording a mortgage for $12,000,000, made by the company to the Metropolitan Trust Co., of New York, to secure the first mortgage upon the road and branches. A force will soon be put to work on the Garden City branch running from Riverside, Hodgman County, Kan., and complete it without delay.

Oregon & California.—Judge Lacombe, of the United States Circuit Court at New York, this week granted an injunction in the suit of Carl Politz against the Farmers' Loan and Trust Co., the Oregon & California Railroad Co., the Southern Pacific Co. and the Union Trust Co. The defendants are enjoined from paying any money which they may hold as trustees under the mortgage of June 1, 1881, known as sinking fund money, to the Oregon & California, except under the sinking fund provisions of that mortgage, until the plaintiff has been heard on the application for a perpetual injunction and his petition in a bill of relief has been heard.

Oregon Pacific.—G. W. Hunt, contractor of Tacoma, W. T., has compromised his suit against the company. He accepts a check for $60,000 for his claim and another for $5,073 to cover the costs of the suit. The history of the litigation, as given by the *Oregonian*, is as follows: Mr. Hunt held the contract to build 50 miles of the line, beginning at a point 40 miles east of Albany, Ore. Nelson Bennett's contract was for the building of the 40 miles between Albany and the western end of Mr. Hunt's work. On Dec. 13, 1887, both contractors annulled their agreements and suspended work. Mr. Hunt took this course because he had received no money for four months and could get no satisfaction from the company as to when he would be paid. Both contractors state that they were induced to take the contract from the company on the assurance that it had $2,000,000 in the treasury with $8,000,000 more available; that it had 100 miles of steel rails in San Francisco. Mr. Bennett on Dec. 29 began suit against the company in the State Circuit Court in Portland, Ore., for $551,825, of which $201,825 was claimed as balance due for work performed, $150,000 for decreased valuation of his plant, by reason of the abandonment of the contract, and $200,000 for damages. Mr. Hunt instituted suit for $160 000. Mr. Bennett's suit is still pending, but it is stated it will also be compromised. Mr. Hunt's suit for $160,000 is still pending, but will probably be dismissed. When Hunt annulled his contract, the Oregon Pacific sued him for $150,000. He defended the suit and was awarded a verdict for $76,000. This is the suit he has just compromised.

Work on the road is being pushed rapidly. The track is laid to Mill City, and passenger trains now run to Lyonsville.

Oregon Railway & Navigation Co.—The temporary injunction obtained by Brayton Ives and other stockholders of the company, restraining the directors of the Oregon Railway & Navigation Co. from constructing branch lines in Oregon and Washington and Idaho territories, from building a bridge across the Snake River at Riaria and from using the proceeds of any consolidated bonds of the Oregon Railway & Navigation Co., or any of the bonds on deposit with the Farmers' Loan and Trust Co. for the purposes of construction was modified and continued by Justice Patterson in the Supreme Court at New York this week.

Oregon & Washington Territory.—The company has concentrated all its grading force on the branch to Estes, in order to have it finished by the specified time.

Oxford & Clarksville.—In execution of an agreement of lease by and between this company and the Richmond & Danville, dated Oct. 30, 1888, the Richmond & Danville on Nov. 27 assumed the control and operation of the road and its properties, and will hereafter conduct the same as a portion of the Richmond & Danville Division of the Richmond & Danville Railroad Co. This road has just been constructed from Clarksville, Va., southerly through Oxford, N. C., to Durham, N. C., a distance of over 50 miles. Both points are on the Richmond & Danville.

Oxford & Henderson.—The company having on Oct. 30 leased and conveyed its entire railroad and properties to the Richmond & Danville for a term of years, to take effect Nov. 27, that company has assumed the control and management of the road, which is 13 miles long and extends from Oxford to Henderson, N. C.

Pennsylvania.—The company has asked for proposals for a new coke branch, which is to be part of its southwest system. It will be called the Unity Branch, and will be seven miles long. It will run from Latrobe on the main line to the plant of the Hostetter Coke Company in Westmoreland County, Pa. This will open up between 5,000 and 6,000 acres of new coke territory.

Philadelphia & Reading.—The company will, it is stated, build a branch from its Atlantic City road to Haddonfield, N. J.

Pittsburgh, Fort Wayne & Chicago.—Charles Lanier, of New York, sole surviving trustee under the first, second and third mortgages of the road, petitioned the United States Circuit Court of this district to appoint a co-trustee to take the place of Gen. George W. Cass, deceased, who succeeded Samuel J. Tilden, deceased. J. N Hutchinson, of Philadelphia, was appointed to fill the vacancy.

Pittsburgh & Lake Erie.—At the annual meeting of the company, on Jan. 22, there will be submitted to the stockholders a proposition to increase the company's debt. The amount of increase has not yet been decided upon, but it will be about $1,500,000, partly in stock and partly in bonds. The money is needed to pay off the outstanding scrip, which amounts to about $600,000; to pay off certain small mortgages and to make improvements. The capital stock of the company is $2,100,000 and the bonded debt $2,050,000.

Pittsburgh, Shenango & Lake Erie.—The Central Trust Co., of New York, recorded a mortgage of $2,300,000 against the road last week at Erie, Pa.

Richmond & Danville.—The company has relinquished the control and management of the East Tennessee, Virginia & Georgia and operated lines, which it had assumed as lessee. This is in accordance with the order recently issued by Chancellor Gibson, at Knoxville, Tenn.

The company having leased the road and properties of the Oxford & Henderson and Oxford & Clarksville railroad companies, to take effect from Nov. 27, and the transfers having been made, the Oxford & Henderson and the Oxford & Clarksville will hereafter be operated by this company as a portion of the Richmond & Danville Division.

Richmond & Elnora.—The Board of County Commissioners at Richmond, Ind., has called for an election on Dec. 27, in regard to a subsidy of $125,000 to this road. The company agrees to begin work by April 1, 1889, and to be running a train between Evansville, Ind., and Richmond, by July 1, 1890.

San Antonio & Aransas Pass.—The company will issue first mortgage bonds for $9.000,000, payable in 1928 to the Union Trust Co., of New York, covering rolling stock and everything else; also second mortgage bonds for $8.000 per mile, payable to the Central Trust Co., of New York, in 1913.

San Diego, Cuyamaca & Eastern.—It is reported that ex-Governor Waterman and other large stockholders in this road have sold their interest to a person who is supposed to represent the Union Pacific. The road was projected to extend from San Diego to the Needles, Cal., and it has been located from San Diego to Lakeside, in the El Cajon valley, a distance of over 25 miles, and graded two-thirds of that distance.

San Domingo Central.—The Board of Directors has refused to renew the contract with W. H. Beil for the construction of the road, and has commenced the construction on its own account. The road is 156 miles in length and crosses the island of San Domingo from the Port of Manzanillo to the Bay of Neyba, traversing a region rich in valuable woods for manufacturing purposes, salt and tropical fruits.

St. Catharines & Niagara Central.—It is said that the Michigan Central has acquired this new road, a short line recently built between Niagara Falls, Ont., and St.

Catharines. It is the intention to continue the line to Toronto.

St. Louis, Alton & Springfield.—The company is pushing work on the extension from Newbern to Alton, Ill., 15 miles, and it is thought that the line will be completed by Dec. 15.

St. Louis, Arkansas & Texas.—Tracklaying on the Malden extension of the road was completed to Delta last week. The road will be ballasted in a very short time and passenger traffic via this route to St. Louis opened up.

St. Louis, Quincy, Omaha & Sioux City.—Articles of incorporation for the company have been filed in Sioux City, Ia., with a capital stock of $12,000,000. The company's object is to operate a through line from St. Louis to Sioux City, by way of Quincy, Hannibal and Omaha. The terminal point and the headquarters of the road will be at St. Louis.

St. Paul, Minneapolis & Manitoba.—The Secretary of the Interior last week heard argument in the matter of the adjustment of the land grant of the company. The question involved is whether, in the adjustment of the grant to the state of Minnesota, to aid in the construction of this road and its branches, the grant should be treated as an entirety, so as to permit the selection of the surplus lands along the main line to make up a deficiency along the line of the St. Vincent extension. Counsel for the road contended that the act of March 3, 1865, authorized the company to make its selections within the 20-mile limits through the entire length of the road and its branches.

Sandusky, Ashland & Coshocton.—The company is endeavoring to secure the right of way from Sandusky to Milan, O., which it is thought will cost $30,000.

Proposals have been asked until Dec. 10 for excavating a quantity of earth at Sandusky for the levee on the water-front. Chas. A. Judson, Sandusky, is Chief Engineer, and W. D. Crane is President.

Sault Ste. Marie & St. Ignace.—A new and more direct line of survey will be begun shortly for the proposed line from Sault Ste. Marie to St. Ignace. If this line is built it will give the Michigan Central and Grand Rapids & Indiana roads an outlet to the east, via the Canadian Pacific.

Savannah, Florida & Western.—Officers of this road have filed a charter for a road to extend from Susley to Marion, Hamilton County, Fla.

Scranton & Forest City.—This road, whose incorporation was noted last week, is projected to furnish an outlet for the anthracite coal product of the mines recently developed near Forest City, Pa., which are now extensively worked. The charter issued last week provides for a road 22 miles long, from Scranton, in Lackawanna County, to Forest City, in Susquehanna County.

Seattle, Lake Shore & Eastern.—Tracklaying on the section west from Spokane Falls, W. T., to Davenport, has been completed to Wheatland, a few miles south of Davenport, and the line will soon be opened for both freight and passenger service. Hunt & Patten have completed 10 miles more of road from Gilman to Falls City, W. T., and it has been put in operation.

Seattle & Northern.—This company, whose incorporation in Washington Territory was noted last week, proposes to build the following lines of road: From Seattle, Wash. Ter., north to the Skagit River and thence via Whatcom to a point near Blaine and the British Columbia line, a distance of about 100 miles; from the main line near the Skagit River, up the Skagit River to the mouth of the Sauk River, thence up Sauk River, east and north over the Cascade Mountains, and thence southeasterly to Spokane Falls, Wash. Ter., a distance of 300 miles; from the Skagit River, and running westward via Fidalgo Island to Ship Harbor, thence southward via Deception pass to Admiralty head on Whidbey Island, a distance of 35 miles. At Fidalgo Island and Ship Harbor the company owns valuable harbor property and 3,000 acres of valuable coal lands. The lines will traverse a country rich in mineral coal and timber. Work will be pushed early in the spring on the Fidalgo Island branch.

Sierra Alhamilla.—Incorporated in New York to build a railroad from the Port of Almeria, in the province of Almeria, to and beyond the mines of Sierra Alhamilla, in Spain. The capital stock is $1,000,000. The directors are Robert L. S. Hall, Charles L. Miller, Lenox Smith, James Francis, Stephen W. Doubleday and Edwin N. Hill, of New York, and Charles H. Smith, of Jamaica.

Silver Springs, Ocala & Gulf.—Tracklaying on the Homosassa division of this company began Nov. 20 and it is expected that the track will be laid to Homosassa by Dec. 15. The Homosassa division will be 24 miles, giving this company about 49 miles, Ocala to Homosassa, Fla.

Southern Pacific.—About 1,800 men are now at work on the new coast line from Templeton, Cal., south, and they have graded and laid track for seven miles south of Templeton. Five hundred laborers a reworking on the 4,000 ft. tunnel between Templeton and San Luis Obispo, and this will probably occupy about a year. From San Luis Obispo to Ellwood the Southern Pacific will probably go around the Santa Ynez, and it is thought that it will be about three years before the first train makes the through trip from Los Angeles to San Francisco over the new road.

The extension west, from Columbus to Johnsonville, Miss., a distance of 142 miles, has been completed to West Point, Miss., giving the latter city a nearly direct line to Atlanta and Birmingham. About 100 miles of the gap between Columbus and Johnsonville have been graded, and about 30 miles of track laid. It is expected that this 141 miles will be completed, and the narrow gauge from Johnsonville to Greenville changed, so as to give a through line of standard gauge from Atlanta to the Mississippi River by next July.

South Mountain.—The sheriff last week offered the road for sale at Lebanon, Pa. It was bid in at $41,000 by F. Hanhauser, of Philadelphia. The conditions of the sale were for cash enough down to satisfy the claim of James March, the execution creditor, which amounted to $34,000. As the purchaser was not ready to comply with these conditions the property was withdrawn and will be resold. Hanhauser claimed to represent the Harrisburg & Eastern and says that if he gets possession work will begin and the road will be finished between Slatington, Pa., and to a connection the Poughkeepsie bridge next spring. A large portion of the roadway between Hamburg and Harrisburg is already graded.

Staten Island Rapid Transit.—The contract to build the line from Roselle, N. J. to the Arthur Kill Bridge has been awarded to Ryan & McDonald. Work will begin immediately.

Texas & Pacific.—An injunction was granted last week by Judge Wallace in the United States Circuit Court at New York in the suit of E. H. Bonner & Co., stockbrokers, against the company and the bankers and trust companies concerned in the payment of interest on the company's first mortgage bonds of February, 1888. The plaintiffs have brought suit to compel the Texas & Pacific to pay for the $15,500 Consolidated and Rio Grande bonds held by them, which it is claimed should be paid before the defendants pay out any interest on the mortgage bonds of 1888.

Texas & Pacific.—It is stated that the company has under consideration the building of several branches in Texas. Among the proposed lines is one from Abilene to San Angelo, about 100 miles, which it is said has already been surveyed. It is stated that if the line is built the company will secure free right of way and station grounds in both cities as well as a cash subsidy.

Tilley Foster Mine.—This railroad company has been organized in New York for the construction of a two-mile road in Putnam County. The trustees are Edwin F. Hatfield, Benjamin G. Clark, Percy R. Pyne, William E. Dodge, Jr., Stephen S. Palmer, all of New York. The capital stock is $30,000.

Toledo, Indianapolis & St. Louis.—The company has filed a charter in Illinois to construct a line to extend from a point on the Wabash River, at or near Merom, in the county of Crawford, west through the counties of Crawford, Jasper, Effingham, Clay, Fayette, Marion, Bond, Clinton, Madison and St. Clair, to or near the city of East St. Louis. There will also be a line beginning at some point in the county of Crawford, thence southwest through the counties of Crawford, Jasper, Richland, Clay, Wayne, Marion, Jefferson, Washington, Berry and Randolph, to a point at or near the village of Chester, in all a distance of about 290 miles. The capital stock is $5,600,000.

Vicksburg & Meridian.—The sale of the road under decree of the United States Circuit Court of the Southern District of Mississippi has been postponed by the Court from Dec. 4 to Feb. 4, next.

Ulster & Delaware.—Several months ago the Attorney-General of the state of New York, on behalf of the town of Harpersfield, in Delaware County, began a suit against the company asking for the forfeiture of its charter on the ground that the company had not completed its road to its terminus through Harpersfield within the time limited by the statutes. The company in its answer denies the claim of the town, stating that its charter never called for the building of the road, but that another company, part of the franchises of which the Ulster & Delaware had purchased, might have done so, etc. To avoid litigation and to try to settle the matter the president of the company submitted a proposition to the town of Harpersfield, asking the town to discontinue the proceedings and to relieve the company from all liability to the town on account of the non-completion of the road. If the proposition was accepted the company was to give the town promissory notes for $10,000. A special town meeting was called and the proposition was rejected. Harpersfield is situated in the angle of the junction of the counties of Delaware, Otsego and Schoharie.

Union Pacific.—Resident Engineer E. C. Kinney, with a large corps of surveyors, is running a line from a point on the Utah Northern below Silver Bow, Mont., westward into Idaho.

Washington & Idaho.—The Secretary of the Interior has approved the map of definite location of the road through the Cœur d'Alene Indian Reservation in Washington Territory.

White & Black River Valley.—At a meeting held in Newport, Ark., this week; the President of the company was instructed to take the necessary steps to consolidate the road with the Batesville & Brinkley, which is now operated between Brinkley and Jacksonport, 65 miles. This road will extend from Jacksonport along the west bank of the Black River to Black Rock, on the Kansas City, Memphis & Birmingham, and thence to the Missouri state line. The work of construction will be commenced early in March.

Williamsville, Greenville & Northern.—The first 12 miles of this road from Williamsville, Mo., are now under construction, and surveys are being made to the Mississippi River. The road is projected to extend from Williamsville to Centralia, Ill., by way of Grand Tower, on the Mississippi River, with several branches, one to St. Louis. The road will pass through pine and oak timber lands and iron ore, lead and other mineral lands.

Wilmington & Weldon.—The extension of the Scotland Neck branch has been completed to Bethel, N. C., and work has been commenced on the extension to Greenville, S. C.

Yazoo & Mississippi Valley.—Judge Hill, of the Federal Court at Natchez, Miss., has sustained the demurrer of the defendants to the bill of the company against the Board of Levee Commissioners, and the company has appealed to the Supreme Court of the United States. The case arose from the road enjoining the collection of the levee taxes which were imposed by the Legislature on all railroads, whether exempted from taxation by charter or not. Defendants' points were, first, that the charter did not exempt; second, if it did it was beyond legislative power to bind subsequent legislatures; third, it was a police power which the legislature could not bargain away; fourth, the legislature could not exempt any particular railroad from taxation even if it could exempt all of its class. The court decided for defendants on the first ground, ignoring the third and fourth grounds.

TRAFFIC AND EARNINGS.

The Inter-state Commerce Commission.

The Commission, by Commissioner Schoonmaker, has rendered a decision in the case of Rice, Robinson & Withrop against the Western New York & Pennsylvania road, dismissing the complaint. The issue presented was the reasonableness of the rates charged for the transportation of refined oil between Titusville, Pa., and Buffalo, N. Y., which were claimed to be excessive. It is held that the rates are reasonable when the increased cost of transportation on account of heavy grades, light local business, etc., is considered, and that the proportion received by the carrier of a through export rate for transportation, in the cars of another company, to Perth Amboy, N. J., via Buffalo, is not a fair standard of what should be charged for transportation to Buffalo, which is in its own cars and is subject to terminal and other additional expenses. In speaking of pipe-line competition, the Commission says a carrier cannot be required to make good to a shipper disadvantages of location or of cheaper facilities for reaching markets enjoyed by its competitors, but adds that had the fact satisfactorily appeared that the rate was made at the behest or to favor the pipe-line shippers, the case would have presented a different aspect. The necessity of deck loading in order to place in a car the number of barrels designated as a car load is spoken of, and any expense which the shipper is put to thereby is declared to be an excess of the tariff rate and unlawful.

On Nov. 30 a decision by Commissioner Morrison was rendered in the case of the New Orleans Cotton Exchange against the Cincinnati, New Orleans & Texas Pacific and its controlled roads. The Commission holds as follows:

1. To correctly estimate the causes influencing the movement of cotton and the falling off in the proportion of the crop received at New Orleans in recent years, the new rail lines of transportation constructed, improved methods, and new conditions must be taken into account.

2. Whether railroad companies combine or act separately in making rates and charges is not so important, the essential requirement is that, however made, they shall be reasonable of themselves and so fairly adjusted as to be reasonable in their relations to each other and in their results.

3. That under like conditions freight can be carried proportionately lower for long than for short distances is as nearly settled as anything relating to railroad charges can be. Equal mileage rates would often prevent legitimate competition and give a monopoly in transportation to the best and shortest road.

4. The reasonableness of rates cannot be fairly determined in a proceeding to which some of the parties responsible for such rates are not parties.

5. Commerce between points in the same state, but which, in being carried from one place to the other, passes through another state, is inter-state commerce and subject to regulation by the provisions of the act to regulate commerce.

6. In determining what are reasonable rates, the fact that a road earns little more than operating expenses is not to be overlooked, but it cannot be made to justify grossly excessive rates. Wherever there are more roads than the business at fair rates will remunerate, they must rely upon future earnings for the return of investment and profits.

7. To be reasonable the rate on compressed cotton from Meridian to New Orleans should not exceed $1.50 per bale.

Traffic Notes.

The Philadelphia & Reading has rescinded its notice refusing to take freight from the seaboard to Chicago on the 50-cent basis.

The excursion run by the Chicago, Rock Island & Pacific on the opening of its new line to Colorado, led competing lines to offer similar trains, and about 3,000 excursionists were landed in Denver in a single day. The round trip rate from the Missouri River was $10.

Eastern visitors are arriving at Los Angeles, Cal., at the rate of about 1,500 a week.

The Pennsylvania announces that it will run express trains between Philadelphia and Washington in 3 hours and 9 minutes, which is a trifle shorter time than that made by its competitor, the Baltimore & Ohio.

Lake rates from Chicago to Buffalo after the expiration of the time limit of marine insurance rose sharply, 3½ and 4 cents per bushel being paid on corn.

Southwestern Passenger Rates.

First-class rates from Chicago to Council Bluffs are now $10, and to other Missouri points $9.50. This reduction is in consequence of certain roads having placed large quantities of tickets in the hands of scalpers on commissions, which allowed of material reduction in the price to passengers.

Trunk Line Rates.

The general managers of the roads in the Central Traffic Association, at a meeting in Chicago last week, agreed to restore east-bound rates on all classes of freight, except live stock. Dressed beef rates are advanced to the basis of 50 cents per 100 lbs., and live stock rates to 22½ cents per 100 lbs. to New York. Dressed beef to Boston is 50 cents, the Grand Trunk being allowed to take it at 45. The meeting voted that the Chicago & Atlantic take the same to New York at 45 cents. This is a differential of 1½ cents less than the road demanded, and may not be accepted. The action of this meeting raises grain rates to a basis of 25 cents Chicago to New York, an advance of 5 cents over the rates prevailing for several weeks past. The change goes into effect Dec. 17. The meeting resolved "That we will not allow any inducements to shippers, consignees or connecting roads to transfer freight from one road to another; or to pay or authorize to be paid any sum for commissions, cartage, loading charges, icing charges or other charges which may have the effect of reducing through or local rates or divisions thereof and giving shippers or consignees undue advantages." It is charged that grain from Chicago shippers has lately been taken to the seaboard at 18.2 cents, which is the proportion accruing east of Chicago on grain billed through from Peoria. False transfer slips or shipping orders were made showing that the grain apparently came from Peoria.

Traffic of the Lakes.

The *Chicago Tribune* gives the following review of the business of the lake vessels for the season just closing:

The marine season began with an outlook for stagnation and financial disaster. When it ended the profit and loss account showed a successful business in which the earnings, while not reaching the high-water mark of 1887, gave good returns on the capital invested. It was a period of development in the lake marine. The great prizes the boats had won in the preceding year had kept the shipyards busy turning out an immense fleet for the new season's business. Spring was well advanced before a pound of ore had been sold to the furnace-men, and the docks contained a vast amount of it held over. Grain freights at the opening of navigation were considered ruinously low. Coal opened weak and lumber carriers went begging for loads. Many new vessels were entering the field. But in June there came a change. The rates on ore, the mainstay of lake commerce, advanced from 85 cents from Escanaba, notch by notch, until they reached $1.25 on a demand that took all the room offered. Grain freights picked up somewhat, and for a time were double their opening figures. The unparalleled movement of anthracite coal gave the fleets return loads at fair prices. There was business enough for the new lake marine and some to spare.

The growth of the lake marine has been more marked in the Lake Superior trade than elsewhere. Month by month the tonnage passing the Soo Canal far exceeds all its predecessors, and there is every probability of a repetition of the story next year. The Manitoba road has placed a strong line of steamers between Duluth and Buffalo. * * Between Chicago and Buffalo there was one new line of railroad boats, the Lackawanna. All the other lines except the Anchor increased their fleets by the addition of magnificent models of marine architecture. The addition of facilities was not greater than the growth of business. The package freight traffic both ways has exceeded that of any previous year. Rates, sympathizing with the railroad wars, have fluctuated greatly, and much of the time have been near the limit of doing business for nothing. The Lehigh Valley has now building two steamers of 2,500 tons and to cost $250,000 each.

When it comes to lumber freights the season's outcome has not been so bright. Rates have ruled low from the outset up to within a fortnight of the close. Large numbers of the

smaller schooners were forced out of the grain trade by the big fellows, and entered the already overcrowded field of lumber-carrying. Few of the boats have made much money, and many come out of the season's business at a practical loss. The steam barges have done better, and the good freights they have been receiving for a couple of weeks will round out a fair profit account. The days of lumber-hookers are numbered, and in a few years they will become a relic of earlier times.

The people who view the season of 1888 with the greatest pleasure and rose-colored profits are the marine underwriters. Their companies have experienced the most successful season ever known on the great lakes. Premiums have ranged from 3.82 to 10 per cent. With the enormous increase in the number of boats and their value the premiums have been heavy, while the losses for the season have been insignificant. Probably the rivers and the Soo passage will be found to be responsible for most of what the insurance companies have paid out. The big iron boats have suffered the most at these points. The straits of Mackinaw have furnished few disasters.

In freedom from loss of life the season has no precedent. The fall storms never came. November was as good a sailing month as June. Oct. 2 five lives were lost by the capsizing of a life-boat at Port Sanilac. This, together with the foundering of a small hooker on Lake Ontario, make up the season's record. Compared with 1887 the passenger traffic on all the lakes shows a marked falling off, due in a large measure to the late coming of warm weather and the cold spell in August, which put a damper to all excursion business.

Underbilling.

Chairman Albert Fink has issued a statement showing the operation of the freight inspection bureaus established by the joint committee at the western termini of the trunk lines during the first six months of operation, beginning April 1, 1888. It was originally intended that the inspectors should have jurisdiction over rates, weight and classification, and should correct all cases of irregular billing. This plan was carried out until the beginning of July, when rates having become generally demoralized, it was found impracticable to continue correcting rates to the basis of the tariff, and on July 21 the inspectors were instructed to confine their corrections to underbilling in weight and erroneous description of shipments. During the period covered by the report, the revenue of all roads interested, by reason of corrections made at the Western termini of the trunk line, was increased as follows:

	Account of weight.	Account rates and classification.	Total.
First three months	$42,019	$47,233	$89,282
Second three months	41,953	8,061	50,014
Total	$84,002	$55,294	$139,296

The expense of the inspection bureau at the western termini of the trunk lines during the six months was $19,264, which was paid by the Western roads and the trunk lines in equal parts, leaving a net gain of $120,048, one-half of which increased revenue may be assumed to have accrued to the Western roads and one half to the trunk lines. The cost of inspection at eight points west of the termini of the trunk lines during six months, which was also divided equally between the trunk lines and Western roads, was $11,544. The inspection of west-bound freight at New York city during the same period shows an increased revenue derived by the trunk lines of $43,830, and the expense to the trunk lines was $11,383, leaving $32,447 as the net result. The roads west of the trunk lines share in the benefit of this inspection to about the same extent.

Coal.

The coal and coke tonnage of the Pennsylvania originating on lines east of Pittsburgh and Erie for the week ending Nov. 24, and the year to that date, was as follows:

	Coal.	Coke.	Total.
Total for week ending Nov. 24	252,271	99,867	352,138
Total for year 1888 to date	10,502,467	3,655,452	14,157,919
Total for year 1887 to same date	9,283,248	3,305,233	12,588,481

The anthracite coal tonnage of the Belvidere division of the United Railroads of New Jersey division for the same periods was as follows:

	1888.	1887.	Inc.
Total for week	37,725	31,561	6,164
Total for year	1,512,056	1,391,015	121,041

Cotton.

The cotton movement for the week ending Nov. 30 is reported as follows, in bales:

	1888.	1887.	Inc. or Dec.	P.c.
Interior markets:				
Receipts	155,295	192,282	D. 36,987	19.2
Shipments	130,636	152,508	D. 21,872	14.3
Stock	308,102	449,202	D. 141,100	31.4
Seaports:				
Receipts	258,091	252,406	I. 5,685	2.2
Exports	209,165	164,603	I. 44,562	27.0
Stock	778,973	900,435	D. 121,462	13.5

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Dec. 1, amounted to 61,361 tons, against 64,683 tons during the preceding week, a decrease of 3,322 tons, and against 53,677 tons during the corresponding week of 1887, an increase of 7,684 tons. The proportions were:

	W'k to Nov. 24.		W'k to Dec. 1.	
	Tons.	P. c.	Tons.	P. c.
Wabash	6,929	10.7	7,558	12.3
Michigan Central	7,622	11.8	9,539	15.6
Lake Shore & Mich. So.	9,717	15.0	8,051	13.1
Pittsburgh, Ft. W. & Chicago	8,473	13.1	7,218	11.8
Chicago, St. L. & Pittsburgh	6,923	10.7	4,072	6.6
Baltimore & Ohio	4,329	6.7	2,730	4.4
Chicago & Grand Trunk	10,922	16.9	11,974	19.5
N. Y., Chicago & St. Louis	4,551	7.0	3,484	5.7
Chicago & Atlantic	5,217	8.1	6,735	11.0
Total	64,683	100.0	61,361	100.0

Of the above shipments 3,205 tons were flour, 28,352 tons grain, 4,265 tons millstuff, 4,267 tons cured meats, 3,142 tons lard, 6,800 tons dressed beef, 2,201 tons flax seed, 531 tons butter, 1,410 tons hides, 426 tons wool and 3,136 tons lumber. The three Vanderbilt lines carried 34.4 per cent. while the two Pennsylvania lines carried 18.4 per cent.

Railroad Earnings.

PHILADELPHIA & READING

Railroad Co.

Month of October:				
Gross earnings	$2,155,953	$2,085,791	I.	$70,163
Oper. expenses	1,007,712	977,250	I.	30,462
Net earnings	$1,148,242	$1,108,541	I.	$39,701
Dec. 1 to Oct. 31:				
Gross earnings	$18,906,574	$19,666,034	D.	$759,460
Oper. expenses	10,080,908	9,583,649	I.	1,497,259
Net earnings	$8,825,682	$10,082,385	D.	$1,256,703

Coal & Iron Co.

Month of October:				
Gross earnings	$2,140,684	$2,321,205	D.	$180,521
Oper. expenses	2,118,706	2,087,711	I.	30,995
Net earnings	$21,978	$233,494	D.	$211,416
Dec. 1 to Oct. 31:				
Gross earnings	$17,140,890	$17,203,010	D.	$62,120
Oper. expenses	17,057,490	16,127,673	I.	929,817
Net earnings	$83,400	$1,075,337	D.	$991,937

CAIRO, VINCENNES & CHICAGO.

Month of October:	1888.	1887.	Inc. or Dec.
Gross earnings	$70,153	$74,545	D. $4,392
Oper. ex. and taxes	42,834	45,768	D. 2,934
Net earnings	$27,319	$28,777	D. $1,458

DENVER & RIO GRANDE WESTERN.

Month of October:				
Gross earnings	$145,249	$137,175	I.	$8,704
Oper. expenses	79,138	80,436	D.	1,298
Net earnings	$66,110	$56,738	I.	$9,372

LOUISVILLE & NASHVILLE.

Month of October:				
Gross earnings	$1,437,054	$1,538,706	D.	$101,652
Oper. expenses	878,580	909,775	D.	31,195
Net earnings	$558,474	$628,931	D.	$70,457
July 1 to Oct. 31:				
Gross earnings	$5,511,247	$5,672,839	D.	$161,592
Oper. expenses	3,442,384	3,353,481	I.	88,903
Net earnings	$2,068,863	$2,319,358	D.	$250,495

LAKE SHORE & MICHIGAN SOUTHERN.

July 1 to Sept. 30:				
Gross earnings	$4,680,850	$4,858,815	D.	$177,965
Oper. expenses	2,811,172	2,583,862	I.	227,310
Net earnings	$1,869,678	$2,274,953	D.	$405,275
Other income	13,214	8,466	I.	4,748
Net increase	$1,882,892	$2,283,219	D.	$400,527
Charges	1,046,869	1,043,466	I.	3,403
Balance	$836,023	$1,239,953	D.	$403,930
Cash on hand	2,057,792	1,489,545	I.	578,247
Surplus	10,740,716	9,444,889	D.	1,295,827

NEW YORK, LAKE ERIE & WESTERN.

Month of October:				
Gross earnings	$2,562,316	$2,550,008	I.	$12,308
Oper. expenses	1,553,889	1,528,110	I.	25,779
	$1,008,427	$1,021,898	D.	$13,471
Less proportions due leased lines	221,958	240,793	D.	18,835
Net earnings	$786,469	$781,105	I.	$5,364

NORTHERN CENTRAL.

Month of October:				
Gross earnings	$586,845	$501,293	I.	$85,552
Oper. expenses	558,727	444,902	I.	113,825
Net earnings	$28,118	$56,391	D.	$28,273
Ten Months—Jan. 1 to Oct. 31:				
Gross earnings	$5,215,742	$5,180,482	I.	$35,260
Oper. expenses	3,521,302	3,398,986	I.	122,316
Net earnings	$1,694,440	$1,781,496	D.	$87,056

NORFOLK & WESTERN.

Month of October:				
Pass., mail and ex	$94,922	$84,007	I.	$10,915
Freight	372,853	349,844	I.	23,009
Gross earnings	$467,776	$433,851	I.	$33,924
Expenses and taxes	266,726	233,585	I.	33,140
Net earnings	$201,050	$200,266	I.	$783
Jan. 1 to Oct. 31:				
Pass., mail and ex	$828,620	$667,089	I.	$161,531
Freight	3,233,554	2,771,065	I.	462,489
Gross earnings	$4,062,175	$3,438,154	I.	$624,020
Expenses and taxes	2,462,571	2,027,592	I.	434,979
Net earnings	$1,599,603	$1,410,562	I.	$189,041

CANADIAN PACIFIC.

Month of October:				
Gross earnings	$1,348,699	$1,240,000	I.	$108,690
Oper. expenses	768,737	707,591	I.	61,146
Net earnings	$579,962	$532,409	I.	$47,553
Ten Months—Jan. 1 to Oct. 31:				
Gross earnings	$10,720,130	$9,144,486	I.	$1,575,644
Oper. expenses	7,847,289	6,515,174	I.	1,332,115
Net earnings	$2,872,841	$2,629,312	I.	$243,529

NEW YORK CENTRAL & HUDSON RIVER.

Quarter ending Sept. 30:				
Gross earnings	$9,490,062	$9,550,074	D.	$60,012
Oper. expenses	6,548,439	6,063,068	I.	485,371
P.c. exp. to earn	69	63.48		
Net earnings	$2,941,623	$3,487,006	D.	$545,383
Fixed charges	1,966,884	1,889,324	I.	77,560
Profit	$974,739	$1,597,682	D.	$622,943
Dividend	894,283	894,283		
Surplus	$80,456	$703,399	D.	$622,943
Year ending Sept. 30:				
Gross earnings	$36,132,920	$35,297,056	I.	$835,865
Oper. expenses	24,626,338	22,388,623	I.	2,237,715
Pc. of exp. to earn	68	63		
Net earnings	11,506,582	12,908,432	D.	1,401,850
Fixed charges	7,831,464	7,760,924	I.	70,540
Profit	3,675,119	5,147,508	D.	1,472,389
Dividend	3,577,132	3,577,132		
Surplus	$97,987	1,570,376	D.	$1,472,389

ATCHISON, TOPEKA & SANTA FE.

Month of October:				
Gross earnings	$1,560,743	$1,674,161	D.	$113,418
Oper. expenses	957,688	808,080	I.	149,608
Net earnings	$603,055	$866,080	D.	$263,026
Ten months—Jan. 1 to Oct. 31:				
Gross earnings	$12,799,735	$15,308,334	D.	$2,508,599
Oper. expenses	8,788,466	8,209,880	I.	578,586
Net earnings	$4,011,269	$7,098,454	D.	$3,087,184

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of October:	1888.	1887.	Inc. or Dec.	P.c.
Allegheny Valley	$202,468	$192,679	I. $9,789	5.1
Net	104,278	92,037	I. 12,241	13.3
Balt. & Potomac	144,338	133,628	I. 10,710	8.0
Net	53,931	60,901	D. 6,970	11.4
Cairo, Vin. & Chic	70,153	74,545	D. 4,392	5.9
Net	27,319	28,777	D. 1,458	5.1
Camden, Atl. & brs.	41,135	37,520	I. 3,615	9.6
Net	def. 3,354	def. 3,579	I. 225	...
Canadian Pacific	1,348,700	1,263,966	I. 84,734	6.7
Net	579,963	532,410	I. 47,553	8.9
Cape F. & Yad. Val.	35,989	29,128	I. 6,861	23.5
Net	20,190	15,474	I. 4,716	30.4
Cen. of New Jersey	1,315,868	965,749	I. 350,119	37.3
Net	647,638	378,878	I. 268,760	70.9
Cin., Ind., St. L. & C.	251,512	242,173	I. 9,339	3.8
Net	90,150	99,570	D. 9,420	9.5
Clev., Col., Cin. & In.	740,853	805,913	D. 66,060	8.1
Net	274,559	334,183	D. 59,624	17.8
Duluth, S. S. & Atl.	170,007	179,962	D. 9,955	5.5
Net	64,886	97,919	D. 33,033	33.7
N. Y., Lake E. & W.	2,562,316	2,550,008	I. 12,308	.5
Net	1,008,427	1,021,898	D. 13,471	1.3
Less proportions due leased lines	786,470	781,105	I. 5,365	.7
Northern Central	586,846	501,294	I. 85,552	17.6
Net	208,119	56,391	I. 151,728	....
Northern Pacific	2,260,656	1,674,881	I. 585,775	35.0
Net	1,007,819	912,121	I. 95,698	10.5
Pennsylvania	5,146,157	4,989,521	I. 156,636	3.1
Net	1,775,244	1,722,988	I. 52,256	3.0
Petersburg	30,555	29,494	I. 1,061	3.5
Net	11,899	17,582	D. 5,683	32.3
Philadelphia & Erie	441,026	368,619	I. 72,407	19.6
Net	169,326	153,034	I. 16,292	10.5
Phila. & Reading	2,155,953	2,085,791	I. 70,162	3.4
Net	1,148,242	1,108,541	I. 39,701	3.6
Coal & Iron Co	2,140,684	2,321,204	D. 180,520	7.8
Net	21,977	233,493	D. 211,516	90.6
Total both co.'s	4,296,637	4,406,995	D. 110,358	2.5
Net	1,170,219	1,342,034	D. 171,815	12.8
Rich. & Petersburg	23,703	19,322	I. 4,381	22.7
Net	11,211	10,052	I. 1,159	11.4
West N. Y. & Penn.	318,346	260,053	I. 58,293	22.4
Net	98,818	68,571	I. 30,247	44.1
West Jersey & br	116,409	104,208	I. 12,201	11.7
Net	27,458	27,580	D. 122	....
Wisconsin Central	424,811	385,784	I. 39,027	10.1
Net	182,591	.....	.....	....
Total (gross)	$20,528,485	$19,216,442	I. $1,312,043	6.7
Total (net)	7,348,099	6,968,821	I. 379,278	5.4
Ten months—Jan. 1 to Oct. 31:				
Allegheny Valley	1,718,153	1,676,230	I. 41,923	2.5
Net	725,699	646,694	I. 79,005	12.2
Balt. & Potomac	1,284,838	1,197,534	I. 87,304	7.3
Net	436,217	456,499	D. 20,282	4.4
Camden & Atl. & br.	623,823	610,302	I. 13,521	2.2
Net	135,047	152,353	D. 17,306	11.3
Canadian Pacific	10,720,130	9,168,435	I. 1,551,695	16.9
Net	2,872,842	2,629,312	I. 243,530	9.3
Cape Fear & Yad Val	267,839	222,851	I. 44,988	20.2
Net	123,751	106,522	I. 17,229	16.1
Central of N. Jersey	11,025,694	9,481,588	I. 1,544,106	16.3
Net	5,031,558	4,192,293	I. 839,265	20.2
Cin., L. St. L. & C.	2,218,201	2,235,005	D. 16,804	.8
Net	817,081	873,649	D. 56,568	6.5
Clev., Col., Cin. & I.	6,323,057	6,573,184	D. 250,127	3.8
Net	1,853,066	2,264,409	D. 411,343	18.1
Duluth, S. S. & Atl.	1,244,988	1,260,478	D. 15,490	1.2
Net	.....	.....	.....	....
N. Y., L. E. & W	22,607,252	22,230,223	I. 377,029	1.6
Net	7,702,580	7,607,792	I. 94,788	1.2
Less proportions due leased lines	5,746,109	5,628,621	I. 117,488	2.1
Northern Central	5,215,743	5,180,483	I. 35,260	.7
Net	1,694,440	1,781,496	D. 87,056	4.9
Northern Pacific	14,679,969	11,032,406	I. 3,647,563	33.1
Net	5,666,736	4,668,478	I. 998,258	21.4
Pennsylvania	48,503,133	46,043,195	I. 2,459,938	5.3
Net	16,171,279	15,846,643	I. 324,636	2.0
Petersburg	346,405	295,871	I. 50,534	17.0
Net	102,734	103,029	D. 295	.2
Philadelphia & Erie	3,703,545	3,340,570	I. 362,975	10.9
Net	1,499,782	1,350,004	I. 149,778	11.1
Phila. & Reading	17,190,728	18,089,322	D. 898,594	4.9
Net	8,032,051	9,414,093	D. 1,382,042	14.7
Coal & Iron Co	15,567,489	15,860,496	D. 292,967	1.8
Net	129,602	1,096,985	D. 967,383	88.2
Total both co.'s	32,758,417	33,949,808	D. 191,391	.5
Net	8,161,653	10,511,076	D. 2,349,423	22.3
Rich. & Petersburg	218,794	191,838	I. 26,956	14.1
Net	66,139	78,177	D. 12,038	15.4
West N. Y. & Penn.	2,649,152	2,315,579	I. 333,573	14.4
Net	748,542	483,377	I. 265,165	54.9
West Jersey & brs.	1,338,176	1,271,360	I. 66,816	6.8
Net	488,697	483,323	I. 5,374	1.1
Wisconsin Central	3,199,968	3,109,380	I. 90,588	2.9
Net	.....	.....	.....	....
Total (gross)	$170,677,277	$161,386,320	I. $9,290,957	5.9
Total (net)	54,297,843	54,235,126	I. 62,717	1
Month of September:				
Ft. Worth & Den. C.	105,868	59,256	I. 46,612	78.5
Net	41,758	28,258	I. 13,500	47.7
N. Y., Ont. & West	163,735	156,742	I. 6,993	4.5
Net	34,950	44,343	D. 9,393	21.2
Rome, W. & Ogd	324,129	336,152	D. 12,023	3.5
Net	159,385	176,131	D. 16,746	8.5
Wabash	655,515	691,725	D. 36,210	5.2
Net	163,922	226,685	D. 62,763	27.7
Nine Months—Jan. 1 to Sept. 30:				
Fort. W. & Den. C	745,348	485,912	I. 249,436	53.4
Net	277,823	202,999	I. 74,824	34.9
N. Y., Ont. & West	1,296,983	1,153,455	I. 133,528	11.6
Net	200,465	209,108	D. 8,643	4.1
Rome, Wat. & Ogd	2,476,405	2,361,297	I. 115,108	4.9
Net	1,039,815	1,033,433	I. 6,382	.6
Wabash	4,783,747	5,116,293	D. 332,546	6.5
Net	889,947	1,726,160	D. 836,213	48.4

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

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